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June 4, 2010

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ENTERED
Office of Proceedings
JUN 04 2010
Part of
Public Record

Re: STB Finance Docket No. 35305
Petition of Arkansas Electric Cooperative Cooperation's for Declaratory Order

Dear Ms. Brown,

Enclosed for **FILING UNDER SEAL** in the above-referenced proceeding, please find: a separately packaged original and twenty (20) copies of the Highly Confidential version of the Rebuttal Evidence and Argument of Arkansas Electric Cooperative Corporation together with three (3) electronic discs containing an electronic version of the **Highly Confidential** filing.

I have also enclosed an original and ten (10) copies of a **REDACTED, PUBLIC** version of Arkansas Electric Cooperative Corp.'s Rebuttal Evidence and Argument for filing on the Board's public docket.

Finally, I have enclosed additional copies of the above noted two filings to be date-stamped and returned to the bearer of this letter.

Respectfully submitted

Alex Menendez, Esq.

Enclosures
cc: Parties of Record

PUBLIC VERSION

BEFORE THE
SURFACE TRANSPORTATION BOARD

STB Finance Docket No. 35305

PETITION OF ARKANSAS ELECTRIC COOPERATIVE CORPORATION
FOR A DECLARATORY ORDER

ARKANSAS ELECTRIC COOPERATIVE CORPORATION'S REBUTTAL EVIDENCE AND ARGUMENT

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Dated: June 4, 2010

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BEFORE THE
SURFACE TRANSPORTATION BOARD

STB Finance Docket No. 35305

PETITION OF ARKANSAS ELECTRIC COOPERATIVE CORPORATION FOR A DECLARATORY ORDER

ARKANSAS ELECTRIC COOPERATIVE CORPORATION'S REBUTTAL ARGUMENT

AECC's 1/ rebuttal evidence and argument shows that BNSF's coal dust tariff is unreasonable, and the Board should order BNSF not to enforce it.

I. ARGUMENT

A. BNSF Is Wrong To Try To Limit The Board's Review Of The Coal Dust Tariff.

BNSF argues that, to decide this case, the Board need not resolve the "technical debate" between BNSF and the shipper parties about BNSF's coal dust "emission standards"; all the Board needs to do is decide "whether BNSF can adopt operating rules intended to limit coal dust emissions and whether BNSF's operating rules regarding coal dust are unreasonable." BNSF Reply Argument at 4. Difficulties in determining how much coal is lost off the tops of rail cars is "no excuse" for not approving BNSF's tariff, according to BNSF. Id. at 9. Nor does the

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1/ This Rebuttal Argument uses the same short-hand references as AECC's Opening Argument and Reply Argument. Arkansas Electric Cooperative Corporation is referred to as AECC. BNSF Railway is referred to as BNSF. Union Pacific Railroad is referred to as UP. The Powder River Basin is referred to as the PRB.

Board have to determine whether coal dust caused the two derailments in May 2005; it is "not relevant" that other factors caused the derailments, because it is "undeniable" (says BNSF) that "coal dust was found in the ballast". Id. at 14. Neither is it necessary, BNSF asserts, for the Board to determine whether it would cost more to spray surfactants on coal cars than it would to deal with the coal dust as part of track maintenance. Id. at 19-20.

But how can the Board decide whether the BNSF coal dust tariff is reasonable or not without addressing the nature of the coal dust problem on the Joint Line, without knowing what causes coal deposition on the track, without evaluating the relative costs and benefits of dust suppression and maintenance, without determining whether there is a practical way to determine compliance with any dust-suppression standard? BNSF's answer seems to be that the Board should simply take BNSF's word on all these issues and rubber-stamp approval of BNSF's actions.

Throughout its arguments and evidence, BNSF asserts over and over again that its position is "beyond dispute", "undeniable", "undeniable" (again), "beyond question", "there is no question", "undeniable" (yet again); 2/; opposing arguments are "designed to generate confusion", they deny the obvious, are "highly misleading", a "red herring", "meaningless", "highly misleading" (again), "unfounded", "irrelevant", a "red herring" (again), deny the obvious" (again). 3/ Of course, this is advocacy; there's nothing wrong with advocates using embellished adjectives and adverbs – AECC may do so occasionally, too. The difference is that

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2/ BNSF Reply Evidence and Argument, Counsel's Reply Argument and Summary of Evidence ("BNSF Reply Argument"), at 2, 6, 14; Reply Verified Statement of William VanHook ("VanHook Reply VS") at 2, 3, 11.

3/ BNSF Reply Argument at 4, 6, 10, 14, 16, 18, 21, 26, 27; VanHook Reply VS at 3.

too often BNSF uses words like "undeniable" or phrases like "beyond question" in lieu of evidence.

As discussed in greater detail in this rebuttal filing, key elements of BNSF's rationale for its coal dust tariff are without substantial evidentiary support. Coal dust is not a more dangerous ballast contaminant than any other, it did not cause the back-to-back derailments in May 2005, it is not impossible to deal with coal dust through normal maintenance activities, there are reasonable alternatives to surfactants as a way of dealing with coal dust, and so forth. The evidence presented by AECC, and others, shows that coal dust is a ballast contaminant like many others, that can be dealt with through familiar maintenance procedures; that the maintenance challenges BNSF faces on the Joint Line are due to the tremendous volume of lucrative traffic it handles on that line, not the supposedly pernicious nature of coal dust; that BNSF's own operating and maintenance practices cause much of the coal dust depositions on its lines.

Contrary to BNSF's wish, this Board is not a rubber stamp for railroad decisions. Under 49 USC 10704 the Board has the power and responsibility to determine whether railroad rules are reasonable. With the close of evidence in this case, the Board is in a position to conclude that the coal dust tariff is unreasonable and should be disapproved.

B. Expert Consensus Refutes BNSF's Claim That Coal Dust Is A "Particularly Pernicious" Ballast Foulant.

Over and over again, BNSF portrays coal dust as the worst fouling agent for ballast.

> The properties of coal dust – it absorbs water, expands when exposed to water and acts as a lubricant – make it a particularly pernicious foulant of rail ballast.

BNSF Reply Argument at 2 (emphasis added). See, also, Id. at 7, 10, 11; Sloggett Reply VS at 10.

Coal dust is so bad that it sometimes seems to have magical qualities. Thus, although BNSF maintained the Joint Line "to a high standard", which could not be "faulted", the "impact of coal dust on the track structure" unexpectedly caused two loaded coal trains to derail within a few hours of each other and shut down the line. Fox VS at 5-6. BNSF Reply Argument at 14-15.

Yet aside from repeatedly saying so, BNSF offered only a single piece of evidence to support its claim that coal dust is a worse ballast foulant than all the others. 4/ This is a study by BNSF's witness Tutumluer, presented by BNSF in its opening filing. See Tutumluer VS at 4-11. In this study, Prof. Tutumluer compared the effect of three contaminants on ballast: "(1) non-plastic mineral filler, (2) plastic clayey soil, and (3) coal dust." Id. at 5. He concluded that "coal dust was by far the worst fouling agent" of the three tested. Id. at 11.

The problem with this study was identified by AECC's witness Nelson in his reply statement. Prof. Tutumluer was comparing the effects of equal weights of mineral filler, soil, and coal dust. However, it is the volume of the contaminant, not its weight, that determines its effect on the ballast. Fouling fills up the spaces ("voids") between the ballast particles, and this is a function of the volume of the foulant, not its weight. Compared to soil and mineral filler, coal dust is much less dense, that is, a given weight of coal dust has a greater volume and will fill up more of the voids than the same weight of mineral filler or soil. A proper comparison

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4/ Ballast can also be fouled by windblown dirt, abraded particles from the ballast itself, concrete particles from abrasion of concrete ties, sand used to improve locomotive traction on grades, and other fine particles. See De Berg VS at 2-3, 6; De Berg Reply VS at 7-9; De Berg Rebuttal VS at [11 in current draft in 3P discussion mentions abrading ties; 16 locomotive sand

would use equal volumes of contaminants, not equal weights. If you compare equal volumes of the three contaminants that Prof. Tutumluer studied, coal is revealed not to be dramatically "worse" (or "better") than the others. See Nelson Reply VS at 2-5. See also AECC Reply Argument at 22-24.

Mr. Nelson's observation that ballast contaminants should be compared on the basis of volume not weight has now been echoed by every other witness who has addressed the issue. UP's witness McCulloch, Senior Vice President and Director of Railroad Services for Shannon & Wilson, Inc., explains in his reply statement that it is wrong to compare coal dust with other contaminants by weight, rather than volume. McCulloch Reply VS, *passim*. Rail ballast may be fully fouled by coal dust at or near the 15 percent by weight level (let alone the 25 percent by weight level tested by witness Tutumluer). See Id. at 8. This confirms Mr. Nelson's conclusion that Prof. Tutumluer was improperly comparing ballast that was fully fouled by coal dust to ballast that was only partially fouled by the other substances; thus, his findings do not show that coal dust is a worse contaminant than any other, but reflect nothing more than the obvious proposition that fully fouled ballast is less stable than partially fouled ballast.

Even BNSF's witness VanHook says that:

> In assessing the impact of a ballast fouling agent, the more important figure [i.e., more important than weight] is the percentage of fouling agent by volume. This is because ballast is weakened when particles fill in the voids between the granite rocks that form the ballast.

VanHook Reply VS at 6. Thus, there is agreement among the railroad experts and AECC's Mr. Nelson that the relative fouling characteristics of coal dust and other ballast contaminants must be determined on the basis of the volume of the contaminants, not their weight.

Prof. Tutumluer's study is therefore invalid, because it compared equal weights but unequal volumes of coal dust and other contaminants. With the Tutumluer study debunked, BNSF is left with no evidence at all to support its claim that coal dust is a worse ballast contaminant than all the others – other than repeated assertions by BNSF personnel that coal dust is worse, unsupported by any analysis. See, also, Nelson Rebuttal VS at 15-17.

C. Coal Dust Should Continue To Be Dealt With As A Maintenance Issue.

For more than a quarter of a century, coal has been shipped by rail out of the PRB, and up until now, coal dust deposition on rail lines has been a railroad maintenance responsibility. See BNSF Reply Argument at 11 ("Historically, coal dust emissions from coal cars were addressed through normal maintenance"). Through its coal dust tariff BNSF proposes to change that and to impose on coal shippers the responsibility to prevent coal dust deposition on the Joint Line. BNSF's principal arguments for changing this long-established practice are (1) "the nature and volume of PRB coal traffic" on the Line makes it "impossible to deal with [coal dust deposition] through normal maintenance" (Id. at 12); (2) eliminating coal dust deposition is the only way to eliminate the "risk of a service disruption" to the flow of coal from the PRB to users (Id. at 13); and (3) it would be substantially less expensive for shippers to eliminate coal dust through the use of surfactants than it is for BNSF to deal with coal dust as part of its maintenance activities (Id. at 18-19). 5/

None of these arguments has merit, as discussed below.

5/ In its opening filing BNSF also argued that its coal dust tariff was justified by the property law doctrine of trespass, and by some Interstate Commerce Commission decisions from the early 20th Century. AECC refuted those arguments in its reply. See AECC Reply Argument at 2-7.

1. Maintenance Challenges On The Joint Line Are Caused By Traffic Volume, Not By Coal Dust.

Although coal dust emissions used to be "addressed through normal maintenance", BNSF says that, because of changed circumstances, this is now longer feasible. BNSF Reply Argument at 11-12. What, then, has changed? Coal hasn't changed. The coal that comes out of the PRB today is the same coal that came out of the PRB in 1984. What has changed is the volume of traffic: From 76 million tons in 1984 to 375 million tons in 2008. Bobb VS at 3. That volume, not coal, is the "problem" is clear from BNSF's own description:

> Coal historically was handled in much smaller carload quantities over much lower density line segments. Under those circumstances, coal dust was a nuisance to railroad operators, but it did not require fundamental changes in operating or maintenance practices. Coal operations in the PRB, however, are unique. The PRB originates over 60 loaded unit trains of coal a day, with each loaded unit train over a mile long. The PRB is one of the highest density segments of railroad in the world, and it handles almost exclusively coal trains. While coal dust could be accommodated in the past on lower density lines through normal maintenance practices, coal dust is emitted from PRB coal trains in such large volumes that it is impossible to deal with it through normal maintenance.

BNSF Reply Argument at 12. The coal is the same, and no more coal dust comes off each car than used to be the case. There is "more coal dust emitted from PRB coal trains" because there are so many more trains. The problem isn't coal dust, it's traffic volume.

BNSF witnesses Sloggett and Smith, in their reply statements, describe the tremendous burden that (they claim) fugitive coal dust imposes on the maintenance and operation of the Joint Line. But the main reason that the Joint Line requires so much maintenance effort is that it carries a tremendous volume of traffic, not solely the presence of coal dust. See De Berg Rebuttal VS at 1-3; De Berg Reply VS at 3-4.

In arguing that "normal" maintenance won't suffice to deal with coal dust, BNSF is playing word games. BNSF uses "normal" maintenance to mean the level of maintenance that was required when volumes traffic were substantially lower (See BNSF Reply Argument at 11), not what's required when 60 loaded and 60 empty coal trains operate over the line every day. "Normal" maintenance should mean the regular, scheduled maintenance cycles required for the particular line, based (among other factors) on the traffic volume on the line. Because of the increased traffic, ballast maintenance (and other maintenance activities) need to be performed more frequently. Because there's more coal traffic presumably there's more coal dust, but the increase in coal dust is not disproportionate to the increase in traffic.

It's clear from reading the testimony of Mr. Sloggett and Mr. Smith that BNSF is reluctant to commit the resources necessary to maintain these high density tracks given the tremendous growth of traffic and the resultant increase in maintenance requirements. Mr. Sloggett has track inspectors working 40% overtime (Sloggett Reply VS at 7-8); Mr. Smith has 14 months of maintenance planned for the current year and only 7-10 months in which to do the work (depending on when winter sets in, and when spring comes to Wyoming) (Smith Reply VS at 5). This can only mean that BNSF does not have enough crews and equipment to perform the maintenance that it knows the Joint Line needs.

Mr. Sloggett complains that it's necessary to perform undercutting and surfacing operations more frequently on the Joint Line than would be required under "normal operating conditions." Sloggett Reply VS at 2, 5. But operations on the Joint Line aren't "normal", it's the highest density line in the system. Mr. Smith goes so far as to blame coal dust for 80% of the

maintenance "windows" and 80% of the slow orders on the Joint Line (Smith Reply VS at 3-4, 8), which is absurd on its face.

No witness for BNSF even purports to prove that maintenance demands on the Joint Line have grown disproportionately to its traffic. If BNSF is really performing more ballast maintenance than normal, that probably means that BNSF is trying to skimp on resources and as a result is not doing the job right. See De Berg Rebuttal VS at 3.

Mr. Sloggett claims that "coal dust poses an inherent risk to track stability if allowed to accumulate in railroad ballast, even in small quantities" (Sloggett Reply VS at 10), but Mr. De Berg refutes that:

> This attitude that coal dust is such a dangerous contaminate that it cannot be successfully addressed through maintenance is simply wrong. Experience shows that proper track inspection and maintenance practices can deal with coal dust as well as other ballast contaminates. On a line carrying as much traffic as the Joint Line, this requires a lot of maintenance effort. BNSF needs to stay ahead of the maintenance needs associated with such high volumes by developing and applying corrective inspection and maintenance procedures. I don't see that as having happened. They are relying on system wide procedures and protocol and not seeking and adapting the changes that are necessary to be successful in maintaining the Joint Line. This is not anything like the balance of the BNSF Railway.

De Berg Rebuttal VS at 4.

It isn't difficult to prove that the Joint Line can be successfully maintained, notwithstanding the large volume of coal traffic it carries: Since the derailments in 2005, under pressure from UP, FRA, and customers, BNSF has done so. There is reason for concern that BNSF doesn't entirely have its heart in it, that it's skimping on resources, over stretching its crews, and looking for an excuse to cut back. See Part F, below. But the claim that "it can't be done" is clearly wrong.

2. The Coal Dust Tariff Isn't Necessary To Prevent A Service Disruption.

An essential part of BNSF's argument for the validity of its coal dust tariff is the contention that coal dust is not a maintenance problem, because track maintenance is the railroad's responsibility. 6/ Thus, BNSF's counsel argues that the coal dust tariff is not an attempt "to avoid responsibility for normal maintenance costs"; on the contrary, counsel argues, "BNSF's coal dust standards will have no impact on BNSF's normal maintenance on the Joint Line." BNSF Reply Argument at 13. 7/ Rather, counsel argues, "What BNSF is trying to avoid is the risk of service interruption that flows from the presence of large amounts of coal dust on the right-of-way and in the ballast." BNSF Reply Argument at 13.

Over and over again, BNSF claims that its coal dust tariff must be approved to prevent future service disruptions. See Id. at 13-14 ("expanded maintenance cannot eliminate the risk of a service interruption", Id. at 15-17 (shippers' "cost analyses are meaningless because they ignore the costs of possible service interruptions caused by coal dust fouling"), Id. at 19-20 ("limits on coal dust emissions are critical to ensuring a safe and efficient rail transportation system").

6/ Railroad Ventures, Inc.--Abandonment Exemption--Between Youngstown, OH, and Darlington, PA, In Mahoning and Columbiana Counties, OH, and Beaver County, PA, STB Docket No. AB-556 (Sub-No. 2X), 2008 STB LEXIS 223 (STB served Apr. 28, 2008) ("a carrier must either keep its track in operating condition or promptly obtain authority to be relieved of the common carrier obligation.").

7/ This will disappoint Mr. Sloggett and Mr. Smith, who are looking forward to reduced maintenance demands after the coal dust tariff kicks in.

And over and over again BNSF points to the two Joint Line derailments in May 2005 as examples – indeed, the only examples – of the service disruptions that coal dust can cause:

> BNSF has determined that coal dust needs to be kept out of the ballast because it weakens track strength and can cause instability in track structure which can lead to serious service interruptions, as evidenced by the 2005 derailments. [VanHook Reply VS at 12.]
>
> I do not believe that it is appropriate to consider the reasonableness of BNSF's coal dust standards based on the costs of incremental maintenance compared to the costs of applying surfactants. BNSF has adopted coal dust emissions standards to eliminate a serious risk to the coal supply chain from service failures due to coal dust fouling and to improve the efficiency of coal transportation. [Id. at 23-24.]
>
> [U]nless coal dust emissions from loaded coal cars are significantly reduced, there will always be a risk that ballast fouling and resultant track instability could go undetected, leading to events that have a significant adverse effect on coal deliveries as occurred in May 2005. [Sloggett Reply VS at 10.]

See, also, BNSF Railway Company's Reply To Arkansas Electric Cooperative Corporation's Petition For A Declaratory Order at 4-5.

But coal dust didn't cause the 2005 derailments. The evidence submitted by AECC (and others) shows that BNSF's inadequate maintenance and perhaps deficient construction of the Joint Line caused the 2005 derailments, not coal dust. See, e.g., AECC Opening Argument at 4-15; Nelson VS at 9-25; De Berg VS at 8-12. BNSF presented no evidence or analysis in its Opening that coal dust caused the 2005 derailments, as shown in, e.g., AECC Reply Argument at 9-13; Nelson Reply VS at 16-20. Mr. Nelson and Mr. De Berg refute BNSF's reply arguments on derailments in their respective rebuttals, Nelson Rebuttal VS at 17-31, De Berg Rebuttal VS at 8-18.

In its Reply, in response to AECC's (and other parties') evidence that coal dust did not cause the derailments, BNSF shifts ground and asserts that it is irrelevant that the derailments might have been caused by something else:

> BNSF has not claimed that coal dust was the sole cause of the 2005 derailments. The possibility that there were other contributing causes of the derailments is not relevant in this proceeding.

BNSF Reply Argument at 14. 8/

BNSF can't have it both ways. If it wants to cite the 2005 derailments as proof that coal dust can cause catastrophic service disruptions, then it is obliged to present evidence that coal dust caused the derailments. If BNSF wants to say that the causation of the derailments is irrelevant so it doesn't have to present evidence on that subject, then it must stop using the derailments as an example, its sole example, that coal dust can cause a service disruption.

The issue isn't whether or not coal dust was the "sole" cause of the derailments – in the real world very few events have a single cause. The issue is whether coal dust was a sufficient factor in causing the derailments to justify the imposition of the coal dust tariff in the interests of preventing future service disruptions. BNSF says that it was:

> The important fact here, which is undeniable, is that coal dust was found in the ballast at the derailment sites in substantial quantities and that under the extreme weather conditions at the time, that coal dust contributed to the weakening of the track structure that led to the derailments.

8/ Even if coal dust were only one of the major causes of the derailments, it wouldn't be irrelevant what the other causes were. Of course it matters whether "other causes" than coal contributed to the derailments: Even if coal dust could be entirely eliminated, those "other causes" BNSF wants to ignore could cause future derailments.

BNSF Reply Argument at 14. But saying that it is "undeniable" that coal dust contributed to the derailments is not evidence that it did so, and BNSF has not proved that coal dust played a significant role in causing the derailments. All BNSF has done is repeat, over and over, that coal dust threatens to disrupt Joint Rail service, and to repeat, over and over, the claim that coal dust did so in 2005. Repetition is not the same as evidence.

On the other hand, the evidence presented by AECC, as well as by other parties, shows that coal dust did not cause the derailments. See AECC Opening Argument at 6-15, De Berg VS at 8-12, Nelson VS at 9-25; AECC Reply VS at 9-13, Nelson Reply VS at 16-20; De Berg Rebuttal VS at 8-18, Nelson Rebuttal VS at 17-31.

Other than its unsupported claim that coal dust caused the 2005 derailments, BNSF offers no support for its claim that its coal dust tariff is necessary to prevent a service disruption. As discussed in subpart 1, above, proper maintenance can deal with coal dust deposition on the Joint Line. If the Line is properly maintained in the future, there is no need to fear that another catastrophe will occur. Of course, that's a big "if", because BNSF is trying as hard as it can to skimp on maintenance expenses (see Part F, below). The coal dust tariff is clearly intended to justify doing that.

3. It Would Be Much More Expensive To Reduce Fugitive Coal Dust Through The Use Of Surfactants Than To Continue To Deal With It As Part Of Track Maintenance.

The issue in this case is whether the coal dust tariff is "reasonable", (49 U.S.C. § 11101), and the concept of reasonableness "has long been associated with the balancing of costs and benefits." International Union, United Auto., Aerospace & Agric. Implement Workers v. OSHA, 938 F.2d 1310, 1319 (D.C. Cir. 1991) ("courts have often taken the word 'reasonable'

in a statute to require that burdens be justified by the resulting benefits") (citing Consolidated Rail Corp. v. ICC, 646 F.2d 642, 648 (D.C. Cir. 1981), cert. denied, 454 U.S. 1047 (1981)).

In AECC's opening, we showed that BNSF's own internal analyses showed that it would cost much more to comply with the coal dust tariff than any possible savings in maintenance costs that would result from the dust reduction BNSF seeks to achieve. See AECC Opening Argument, at 17-19, and Nelson VS, at 26-28. See also WCTL Opening Argument, at 34-37 and evidence cited therein. In its opening, BNSF provided no analysis of costs and benefits, as we noted in our reply. AECC Reply Argument at 13-16.

BNSF criticizes these figures because they ignore the "costs of possible service interruptions" and "the impact of increased maintenance on PRB rail capacity". BNSF Reply Argument at 16. But, as discussed in subpart 2 above, coal dust hasn't caused "service interruptions" in the past, and it doesn't threaten "possible service interruptions" in the future. And as discussed in subpart 1 above, coal dust isn't responsible for the fact that the Joint Line needs a lot of maintenance, the tremendous volume of traffic is responsible (and with three tracks throughout, and four tracks in places, there ought to be plenty of capacity on the line to maintain it and operate it at the same time).

Belatedly, in its own reply, BNSF presents a verified statement from its witness Mr. VanHook that, BNSF says, "shows that the incremental maintenance costs associated with coal dust from PRB trains exceeds the cost of surfactant application by a substantial margin." BNSF Reply Argument at 19. Even BNSF doesn't seem to have a great deal of confidence in Mr. VanHook's cost-benefit analysis ("It is not necessary for the Board to bless Mr. VanHook's cost

analysis for purposes of this proceeding" [Id.]), and the rebuttal testimony of AECC's Mr. Nelson shows that BNSF's reluctance was justified.

Mr. VanHook's cost-benefit analysis differs from the results of BNSF's past internal analyses, which concluded that the cost of applying surfactants to coal cars would exceed the savings in maintenance that would be achieved from the reduction in fugitive coal dust. As Mr. Nelson explains in his rebuttal statement, Mr. VanHook is able to show much larger maintenance savings by incorporating into his estimates unexplained and unjustified increases in maintenance costs. For example, in 2005 BNSF estimated the unit cost for undercutting at [redacted] (a figure that was somewhat higher than the figure used by UP and BNSF to apportion Joint Line maintenance costs), but Mr. VanHook uses [redacted] without any explanation. See Nelson Rebuttal VS at 36. In another instance, Mr. VanHook uses a unit cost of [redacted] for vacuum trucks, which represents an increase of [redacted] compared to the 2005 level of [redacted]. Mr. Nelson corrected Mr. VanHook's cost figures and generally used BNSF's 2005 costs plus a reasonable degree of inflation from 2005 to 2010 (generally 12%). Nelson Rebuttal VS at 35-36.

Mr. VanHook also exaggerates the amount of maintenance savings that BNSF might realize if its coal dust tariff achieved its dust-reduction goal. Mr. VanHook's estimate assumes that, without control of coal dust deposition, undercutting would need to be performed on average every [redacted] but this would be extended to every [redacted] if the coal dust tariff were implemented. The 10 year cycle, however, fails to take account of the fact that that coal constitutes at most only [redacted] by volume of the undercutter waste on the Joint Line. The other [redacted] of fouling agents would still be there, and would have to be

removed through periodic undercutting. Eliminating all coal dust fouling would extend the [redacted] cycle to [redacted] not [redacted] Nelson Rebuttal VS at 36.

However, surfactants would not eliminate all fugitive coal dust deposition; a substantial quantity of fugitive coal would still land on the ballast. A study cited by UP found that an average of [redacted] pounds of coal will leave the top of each railcar even with a surfactant applied (compared to 225 pounds if no surfactant is used). Thus, application of a surfactant would only eliminate [redacted] of the fugitive coal accumulation, so BNSF's undercutting cycle would be extended by the tariff from every [redacted] to every [redacted] Id. at 37.

As a result of Mr. VanHook's unjustified increase in unit costs and his failure to take account of undercutting requirements that would exist even after the reduction of fugitive coal dust, his annual estimate for undercutting cost savings is three times what it should be. Id. at 37-38.

Mr. Nelson's revisions to Mr. VanHook's cost estimates to correct these and other errors are discussed in detail in his rebuttal statement at 34-43. What they show is that the analysis that Mr. Nelson presented in his opening, based on BNSF's own figures, is still correct: the cost to comply with the coal dust tariff would far exceed the benefits to BNSF. It is simply not reasonable to require shippers to pay large sums of money to spray surfactants on their cars to save BNSF a little money on maintenance.

* * *

Thus, all three of BNSF's arguments why coal dust should be dealt with by shippers paying to apply surfactants are wrong. The high level of maintenance required on the Joint Line is the result of the high volume of traffic on the line, not the presence of coal dust.

Coal dust did not cause the 2005 derailments and does not threaten to cause another such catastrophic breakdown in service. It would be substantially less expensive to continue to deal with coal dust depositions through maintenance, rather than attempting to suppress it through the use of surfactants.

D. BNSF's Own Operating And Maintenance Practices Are Responsible For Most Of The Coal Dust Deposition On The Joint Line Tracks.

In its opening, BNSF argued that shippers should be required to pay for coal dust suppression because they "own the coal". AECC showed in its reply that this argument was legally incorrect. See AECC Reply Argument at 2-4. In BNSF's reply, they argue that shippers should pay for coal dust suppression because "BNSF does not let any other shipper's freight spill out of the car onto the railroad's right of way, regardless of how much it costs to clean up the spilled freight." BNSF Reply Argument at 15. Whether that assertion is true or not we have no way of knowing, as BNSF has provided no evidence to back it up.

But what we do know now is that BNSF's argument in support of its coal dust tariff is based on a fallacy – the fallacy that BNSF's operations and maintenance have nothing to do with the deposition of coal dust on the tracks from properly loaded and profiled coal cars. In fact, BNSF's operations and maintenance are major causes of coal dust deposition on the tracks.

BNSF's own evidence shows that fugitive coal accumulates disproportionately on turnouts and bridges. Mr. VanHook estimates that turnouts and bridges require removal of fugitive coal accumulations at a frequency [redacted] VanHook Reply VS at Exhibit 7. In his reply statement Mr. Nelson described how this pattern of

deposition results from vibrations associated with modulus changes and/or maintenance practices.

> Such vibration can occur, for example, due to changes in track modulus associated with the use of wood crossties under switches or through the passage of car wheels over a gap in manganese frogs (the vibration from which may be increased if the frog is not properly maintained).
>
> * * *
>
> Poor maintenance of frogs and inattentiveness to modulus changes may cause increased vibration. Thus, while the railroads complain that coal dust necessitates maintenance, in fact poor maintenance may cause a proportion of fugitive coal dust in the first place.

Nelson Reply VS at 6-7.

This conclusion can now be corroborated by a video contained in BNSF's reply evidence that clearly {shows the sequential agitation of each car in a train as it passes over a switch}. 9/ The vibration in this particular case might result from a worn frog, a worn switch point, low joints, or some other cause; it's impossible to tell from the video alone. But conditions like this, which produce unnecessary disturbance of the load, are commonplace under BNSF's maintenance practices on the Joint Line. Nelson Rebuttal VS at 11.

Also in his reply statement, Mr. Nelson described how railroad operating practices could result in increased coal deposition through "slack action" on descending portions of the line ("big sags"). Nelson Reply VS at 7. In his rebuttal statement Mr. Nelson confirms this observation by analyzing data from BNSF's dustfall collectors , which show that higher levels of fugitive coal accumulate on the descending sides of big sags than elsewhere. Nelson Rebuttal VS at 12-13.

9/ Emmitt Reply VS at Exhibit 8, UP 6695.

Another video in BNSF's reply highlights the role of excessive train speed as a cause of fugitive coal deposition in such locations.10/ This video shows a loaded train on the descending side of a big sag, travelling approximately 50 mph and generating a large cloud of dust. This video also shows, on the upwind side of the train, a telltale dust cloud indicative of coal falling directly from the tops of railcars onto the track ballast. The reason for running down hill at such speed is presumably to build up momentum for the following ascent, but this is recognized as a bad practice because it produces excessive wear and maintenance requirements. As the video illustrates, high speed also result in sharply increased aerodynamic pressures, which can dislodge from the tops of coal cars larger quantities of larger pieces of coal that land on the ballast. Nelson Rebuttal VS at 13.

Along with train speed, slack action in train handling increases the amount of coal dust deposition. BNSF has known at least since 1926 that slack action tends to be most significant on longer, heavier trains. Nelson Rebuttal VS at 13. Another video cited in BNSF's reply shows a comparatively gentle occurrence of slack action, in which a shock wave disturbs the top of the load on sequential cars as it propagates from the front to the rear of the train.

11/ [redacted]

Nelson VS at 18 n. 3.

As a result, a substantial portion of the coal and coal dust that falls onto the track structure itself and may foul the ballast – as distinct from airborne dust that falls

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10/ BNSF's Counsel's Exhibit 4, CD 1, BNSF 0022999.

11/ Id., BNSF 0022995

elsewhere and does not foul the ballast – is the direct result of BNSF's operating and maintenance practices. Coal shippers don't run the trains and don't maintain the track – BNSF does – and BNSF should bear the responsibility for cleaning up the coal and coal dust that its own actions cause to fall off the cars and onto the track.

Moreover, applying surfactants to the coal will not prevent coal and coal dust from being shaken from the cars and deposited onto the track as a result of rough track, changes in track modulus, and high speed operations. The thin crust produced by the "low water" toppers being discussed would be unlikely to prevent spillage resulting from slack action and other causes of severe vibrations. There's no realistic way to count on a surfactant standing up to the forces generated by a slack action shock wave strong enough to "slosh" coal out of the car. See Nelson Rebuttal VS 15.

E. BNSF's Dust Monitoring System Does Not Reliably Measure the Deposition of Coal on Rail Ballast

The foregoing discussion establishes that, for several separate and independent reasons, BNSF's coal dust tariff is not reasonable and should not be approved by this Board. Without distracting from that fact, we now turn to a discussion of the way BNSF would monitor compliance with its tariff if the Board allowed it to go into effect. As we show below, BNSF's monitoring system is inadequate to measure with reasonable accuracy the amount of coal dust being deposited on the Joint Line track. Even if the tariff were otherwise reasonable – which it is not – it could not be approved if it can't be adequately monitored.

AECC pointed out in its reply filing that BNSF's dust monitoring system measures only dust that does not fall on the track and therefore cannot foul the ballast. {CITE} In response, BNSF witness Emmitt claims that the airborne coal dust measured by BNSF's

trackside monitors is a "strong covariate" of the coal being deposited in the ballast. Emmitt Reply VS at 3. "Covariate" is a term in statistics that means "any of two or more random variables exhibiting correlated variation." 12/ That is, Mr. Emmitt is claiming that there is a close relationship between the airborne dust measured by his trackside monitors 60' away from the track and the dust that falls onto the track. Is this claim true?

Mr. Emmitt doesn't know whether it's true, because he never studied the question. It "would be an interesting academic exercise", he says, to determine whether there is a correlation between the airborne coal dust measured by the monitors and the coal dust that fouls the ballast, but it would be "difficult", so he didn't make the study. His scientific sounding statement about "strong covariate" turns out to be nothing more than an assumption that he chose not to test. Emmitt Reply VS at 4.

In fact, Mr. Emmitt's own data show that his "covariate" assumption is unlikely, for several reasons. First, the monitor readings appear to be affected by factors that have nothing to do with how much dust is deposited on the track. For example, monitor readings are affected by [redacted] but there's no evidence that [redacted] The monitors also show that dust is generated by [redacted] which don't deposit any coal onto the track. See Nelson Rebuttal VS at 6-7. Mr. Nelson cited such problems with the monitoring system in his opening statement (Nelson VS at 28-29), but BNSF offered no response in its reply.

Furthermore, the data from the monitors shows a noticeable reduction in coal dust in [redacted] If accurate, that data means that coal dust deposition is

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12/ See http://www.merriam-webster.com/dictionary/covariate .

declining, but BNSF insists that things are getting worse not better. Either the measures taken by shippers, mines, and railroads to reduce dust deposition are working, or the track side monitors aren't working properly. Nelson Rebuttal VS at 8.

In addition, when Mr. Nelson compares the dust measured by the monitors with the dust falling to the ground measured by the dust fall collectors he finds that [redacted] – that is, the dust that the monitors measure – falls on the track. Nelson Rebuttal VS at 8-9. Moreover, the amount of airborne dust detected by the dust fall collectors is far less than the amount of coal supposedly lost in transit. If 225 lbs of coal are lost per car, 13/, then only [redacted] of it is captured by the dust fall collectors. Nelson Rebuttal VS at 9-10. Assuming that the other [redacted] falls directly onto the track, that is the primary source of the ballast fouling that BNSF wants to prevent, and the monitors don't measure it all.

Moreover, as discussed in Part D, the coal and dust that falls directly out of the cars onto the ballast – and is therefore the principal source of the ballast fouling that BNSF wants to prevent – is caused by BNSF's own operating and maintenance practices. It does not blow off the tops of cars, it is shaken out of the cars by vibration as the train speeds down a grade, or runs over a worn switch frog, or comes off a bridge.

It is totally implausible to suppose that airborne dust blown off the tops of cars is a "strong covariate" – or indeed any "covariate" at all – with the coal and coal dust shaken off

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13/ This figure comes from an NCTA study cited by UP witness Beck. Beck Reply VS at 2. BNSF's witness Emmitt claims that between 250 and 750 lbs of coal is blown off a coal car during the course of a trip from mine to destination. Emmitt Reply VS at 9-11 (based on a study of 10 cars treated with surfactant compared to 10 untreated cars). The discrepancy between total coal loss and total dust fall would be even greater if the higher dust loss figure were used.

cars because of BNSF's operating and maintenance practices. BNSF's track side monitors do not measure the real source of ballast fouling.

F. BNSF Is Anxious To Reduce Maintenance Expenditures On The Joint Line.

One thing in this case that can be said with certainty is this: If the Board approves BNSF's Coal Dust Tariff, BNSF will substantially reduce its maintenance efforts on the Joint Line. Although BNSF's counsel claims that Board approval of the Coal Dust Tariff will have "no impact on BNSF's normal maintenance costs" on the Joint Line (BNSF Reply Argument at 13 (emphasis added)), the BNSF officers who maintain and operate the Line say otherwise.

The reply testimony of Mr. Sloggett, BNSF's General Director, Maintenance, and Mr. Smith, BNSF's General Superintendent Transportation, Central Region, make clear that their maintenance resources are stretched thin, and that they blame coal dust for the situation. Mr. Smith says that he currently has 14 months of maintenance planned for the 7-10 months of working time available. Smith Reply VS at 5. He complains that "we may not have an available maintenance crew and equipment to perform the necessary maintenance on the slow order area because they are already engaged in other work." As a result, slow orders may remain "in place for a month or even several months", which normally would be lifted after maintenance "within a week or two." Id. at 8-9. Mr. Sloggett reveals that "[d]uring rainy periods, track inspectors are working approximately 40% overtime hours . . . ." Sloggett Reply VS at 8. Mr. Smith goes so far as to blame 80% of currently scheduled maintenance windows 80 percent of the slow orders on coal dust. Smith Reply VS at 3-4.

This testimony shows that at best BNSF is just barely keeping up with current maintenance requirements by stretching to the limit the personnel and equipment it has

committed to those needs. See also the discussion of BNSF's current maintenance practices in De Berg Rebuttal VS at 1-7. And the current period, in which BNSF's maintenance resources committed to the Joint Line are just barely adequate, is a time of lowered traffic volumes due to the national recession. See Bobb VS at 3. As the economy picks up, and with it coal traffic on the Joint Line, these already thin resources will be stretched even thinner.

What BNSF needs to do is commit adequate resources to the maintenance of the Joint Line, consistent with the large volume of traffic the line carries, as Mr. De Berg counsels. But it is as clear as a sunny summer day in Wyoming that BNSF will in fact reduce its maintenance efforts on the Joint Line substantially if the Board approves the Coal Dust Tariff. Mr. VanHook, BNSF's Assistant Vice President and Chief Engineer-Systems Maintenance and Planning, calculates that BNSF will cut maintenance costs on the Orin Subdivision alone by over [redacted] if the Board approves the Coal Dust Tariff. VanHook Reply VS at 28. As discussed in Part C.3, above, this figure is grossly exaggerated, but it provides an idea of what BNSF has in mind for Joint Line maintenance if the Board approves the coal dust tariff.

Approving the coal dust tariff would not, however, lead to anything like the reduction in maintenance needs that BNSF dreams of, for reasons explained elsewhere in this filing. It would be nice to think that BNSF will only cut maintenance costs to the extent that reductions in coal dust deposition lead to less need for track maintenance, but there is every reason to fear the worst. It is clear from the testimony of the BNSF personnel responsible for maintaining the Joint Line that the company has been unwilling to hire the crews and obtain the equipment it needs to maintain the Joint Line properly; 40% overtime and similar expedients can't go on forever. BNSF's hopes that its coal dust tariff will dramatically reduce

the need for maintenance on the Line are almost certainly unrealistic. Nevertheless, the pressure to cut back on overhead and resume "normal" schedules for maintenance crews will be difficult to resist. We know what happened the last time that BNSF decided to save money on Joint Line maintenance. The resulting derailments in 2005 led to huge costs for PRB coal shippers, as well as for BNSF itself and UP. The outcome of this proceeding will determine whether that history will be repeated.

II. CONCLUSION

The evidence in this proceeding is all in. The bases on which BNSF sought to justify its coal dust tariff – the threat of a repetition of the 2005 derailments, the exaggerated claims about the "impossible" burden that coal dust imposes on track maintenance, the peculiarly "pernicious" nature of coal dust as a ballast foulant, the great maintenance cost savings that the coal dust tariff would achieve at only modest cost to shippers, the highly scientific means that BNSF devised to monitor shippers' compliance – all these have been shown to be either unsupported by any evidence, or have been refuted by a greater weight of contrary evidence.

The parties agree on one thing: Proper maintenance of the Joint Line is essential; a repetition of the catastrophe of 2005 would not be tolerable. The parties also agree that dealing with coal dust is a part of the maintenance challenge. But the parties advocate two different approaches to achieve the mutually-desired goal. BNSF argues that spraying dust suppressants on the tops of coal cars will solve the problem and allow a substantial reduction in the maintenance effort on the Joint Line. AECC and other shippers contend that proper

maintenance of the Joint Line, at cycles appropriate to the traffic volume on the Line, will deal with all ballast foulants including coal dust.

Experience teaches us that maintenance will keep the Joint Line up and running, without severe service disruptions, because BNSF has done just that since the recovery from the 2005 derailments. (BNSF's maintenance has not been without shortcomings, of course, but trains are still running). There is no experience with the other approach of substituting coal dust suppression for some portion of the maintenance effort. The evidence in this record shows that that BNSF's coal dust tariff could achieve not its stated goals. Experimenting with that untried method creates a risk – we believe a very substantial risk – that the events of May 2005 will be repeated.

AECC urges the Board to find that BNSF's Tariff 6041-B, Items 100 and 101 (other than the portions dealing with profiling), are an "unreasonable rule or practice" and that the enforcement of them would be an illegal refusal to provide service, and order BNSF not to enforce those provisions.

Respectfully submitted,

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Dated: June 4, 2010

REBUTTAL VERIFIED STATEMENT OF
DOUGLAS G. DE BERG

REBUTTAL VERIFIED STATEMENT OF DOUGLAS G. DE BERG

My name is Douglas G. De Berg. I am an independent railroad transportation systems consultant specializing in track construction and maintenance issues. I have over 40 years experience in these areas. I previously submitted verified statements in this proceeding in the opening evidence and argument of Arkansas Electric Cooperative Corporation (AECC) and in the AECC reply evidence and argument. A summary of my experience is provided in my opening verified statement.

In this rebuttal verified statement I address assertions by the BNSF Railway ("BNSF") (and to a limited extent Union Pacific Railroad ("UP")) in their reply evidence and argument regarding the effect of coal dust on the Joint Line.

1. Coal Dust, MGT and "Normal" Maintenance

In my opening verified statement ("De Berg VS"), in addition to discussing the causes of the 2005 derailments on the Joint Line, I provided an overview of the maintenance requirements for "any heavy-haul rail line", including the Joint Line. See De Berg VS at 2-8. In my reply verified statement ("De Berg Reply VS") I responded to BNSF's attempt to blame coal dust for the fact that the Joint Line requires a lot of maintenance. I explained that the main reason that the Joint Line requires so much maintenance effort is that it carries a tremendous volume of traffic, not solely the presence of coal dust. See De Berg Reply VS at 3-4.

In its Counsel's Reply Argument ("BNSF Reply Argument"), BNSF asserts that circumstances have changed, and that coal dust can no longer be "addressed through normal maintenance", because "coal dust is emitted from PRB coal trains in such large

volumes". BNSF Reply Argument at 11-12. This is incorrect. Coal dust should be treated along with any other ballast contaminate and addressed through planned maintenance cycles. On a railroad with very high annual MGTs, the maintenance cycles needed to address ballast contaminates on a regular basis must be more frequent. This is an industry-wide acknowledged fact.

BNSF's Counsel's Argument misuses the term "normal" maintenance to mean the level of maintenance that was required when volumes traffic were substantially lower (BNSF Reply Argument at 11). If that's what "normal" means, then 60 loaded and 60 empty coal trains/day is not normal either. BNSF's counsel is playing word games. "Normal" maintenance means the regular, scheduled maintenance cycles required for the particular line, based (among other factors) on the traffic volume on the line. The normal maintenance cycles that applied when the Joint Line carried a much lower volume of traffic could not address the increased levels of track maintenance required by current traffic volumes. The increased frequency of ballast maintenance activities needs to be planned for as the MGTs have increased to six times what was normal when the line was built, creating a new normal. BNSF has not addressed what should be new normal maintenance cycles. They have been reluctant to commit the resources necessary to maintain these high density tracks given the tremendous growth of traffic and the resultant increase in maintenance requirements.

Once BNSF began to actually incur the maintenance costs associated with the terrific increase in MGT on the Joint Line, they began to look for ways to pass some of these costs on to others. In an effort to pass some of their increased maintenance costs to shippers BNSF has taken the stance throughout this entire proceeding that coal dust is the

only culprit, but this is not true, as I have shown in my earlier statements, and as I discuss further in the next section of this rebuttal statement.

2. The Effect Of Coal Dust On Maintenance Costs and Maintenance Windows

BNSF's Mr. Sloggett complains about how much undercutting and shoulder ballast cleaning BNSF is performing on the Joint Line, which he attributes to the presence of coal dust. Sloggett Reply VS at 2-4. 1/ I have made the observation throughout my VS and reply VS that BNSF's undercutting operation is not doing what it really needs to be doing. When a track segment is identified for undercutting a pre survey is needed to determine first of all how deep the undercutter needs to cut to remove all of the ballast contaminates or to provide a clean enough ballast structure that will perform for a designed length of time. I don't see any indication that this is done on the Joint Line; it appears that undercutting is scheduled on problematic track segments perhaps using data from track inspection reports, or data from Geometry Cars or Track Strength Vehicles as to where to work needs to be done, but not how much work to do.

BNSF is not fully addressing the problem of ballast cleaning, and as a result is not achieving the economics of doing the job right and providing a track structure for a predetermined length of time. This leads to a lot more interference with operations and reduction of line capacity.

With respect to surfacing, Mr. Sloggett says that, because of coal dust, "we currently surface the track on the Powder River Division on an annual basis, which is

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1/ Mr. Sloggett lists various types of specialized equipment used to remove coal from contaminated ballast (Sloggett Reply VS at 2-5). This is misleading, as the majority of the equipment they use to remove coal are the same types of equipment that have been used for years on railroads around the world to address fouled ballast conditions.

approximately 2 to 3 times as frequently as we would under normal conditions." Sloggett Reply VS at 5. What is "normal"? The Joint Line carries at least 5 to 6 times more tonnage and carries more trains than what is "normal" for any other BNSF line. That in itself would indicate additional surfacing is required. This is another example of the fact that the BNSF "works at" a problem but doesn't really address it because they do not plan and perform maintenance work on the basis of what and how much needs to be done to promote the long term stability and efficient performance of their network. Put another way, they appear to be reactive, rather than proactive, on Joint Line maintenance issues.

Mr. Sloggett claims that "coal dust poses an inherent risk to track stability if allowed to accumulate in railroad ballast, even in small quantities." Sloggett Reply VS at 10. This attitude that coal dust is such a dangerous contaminate that it cannot be successfully addressed through maintenance is simply wrong. Experience shows that proper track inspection and maintenance practices can deal with coal dust as well as other ballast contaminates. On a line carrying as much traffic as the Joint Line, this requires a lot of maintenance effort. BNSF needs to stay ahead of the maintenance needs associated with such high volumes by developing and applying corrective inspection and maintenance procedures. I don't see that as having happened. They are relying on system wide procedures and protocol and not seeking and adapting the changes that are necessary to be successful in maintaining the Joint Line. This is not anything like the balance of the BNSF Railway.

BNSF's Mr. Smith, General Superintendent Transportation, describes the impact that expanded maintenance has had on railroad operations on lines within the PRB that handle large volumes of coal. Mr. Smith says that the number of maintenance windows

and slow orders have increased as the direct result of coal dust fouling. As I have explained, increased maintenance activities on the Joint Line result from very large increases in traffic volumes and initial improper track design, including supporting lines radiating and moving coal outside of the PRB. As I explained in my VS page 7, item 5, coal dust is only one of a number of ballast contaminants that need to be addressed on a regular cycle.

Mr. Smith goes on to describe the impact of this expanded maintenance activity on coal train staging, cycle times, longer routing of coal trains and additional crew costs, among other things. He also states that the increased number of maintenance windows that are required to deal with coal dust and the slow orders that require reduced train speeds on lines that have been destabilized by coal dust dramatically reduce the capacity of BNSF's coal network and interfere with the efficient operation of coal trains. Of course increased levels of maintenance activities and slow orders because of track conditions will have negative effects on efficiency. This is why additional capacity should be designed into a track transportation system as the tonnage grows. Additional tracks are needed based on the number of trains being dispatched and the speeds at which they are running. Any hiccup or unplanned activity whether it be maintenance work, slow orders or a train breaking down will affect efficiency tremendously.

The conditions that Mr. Smith describes would have been expected in the aftermath of the derailments, when BNSF was catching up on deferred maintenance. As I explained in my opening verified statement, the Joint Line had destabilized track because BNSF had not been performing maintenance at an adequate level. If they had pursued a properly planned and executed maintenance program, that would have prevented

destabilized track, and would have supported, rather than impeded, efficient operations. However, after completing the catch-up there is no reason why maintenance on the Joint Line should interfere with normal operations. They have a 3- and 4-track railroad that over any given segment needs to move an average of 2-3 loads and 2-3 empties per hour. Particularly since the triple-track was extended to Shawnee Jct in 2005, with at least triple track everywhere, a line can be taken out for maintenance and still leave directional operations in place. This greatly facilitates maintenance, as have track relocation initiatives to create 25' separations. With proper maintenance planning and execution, they have more than enough capacity in place to handle the traffic. If BNSF is unable to conduct normal operations while properly maintaining the Joint Line, as Mr. Smith seems to say, then BNSF's myopic and substandard maintenance practices must be responsible, because they have plenty of capacity to handle the traffic and maintain the Line.

Mr. Smith is missing the point, first of all, because he assumes that it is only coal dust that causes track instability. I have explained repeatedly in this statement and my previous statements that coal dust is not the only contaminate that has the potential to affect track stability.

Secondly, if current maintenance needs exceed available days to address them in a normal construction season, this is likely an indication that maintenance activities in the past did not stay abreast of the maintenance needs. It may also mean that BNSF has not committed sufficient resources of crews and equipment to satisfy the Line's maintenance needs. Mr. Smith fails to acknowledge that the unprecedented accumulated and occurring MGT have played a major role in increased need for maintenance activities. He further states that they have to detour trains adding miles and cost of operation to the

hauling of coal. I understand that AECC witness Nelson is addressing this issue in his rebuttal verified statement. In addition, I suggest that this too is a case where disorganized, inefficient maintenance winds up increasing costs, because such detours would not be needed under a properly designed and executed maintenance program.

Mr. Smith estimates that "coal dust accumulation contributes to approximately 80 percent of the slow orders imposed on the Powder River Division." Smith Reply VS at 8. He goes on to complain that "slow orders may need to remain in place for days or weeks until we are able to schedule a maintenance window to remedy the affected area." Id. This is what you would expect when the operator of a high density heavy haul railroad overlooks the fact that such a railroad requires a programmed level of maintenance that is more intense than a more normal railroad. The BNSF has failed to plan and deliver scheduled maintenance in line with the needs generated by high tonnage and heavy haul.

It is evident that the tonnage and number of trains handled has outgrown the sustained programmed maintenance effort, and BNSF has been slow to address this issue. Blaming the entire inefficiency issue solely on coal dust is really putting your head in the sand. Expecting your major customers to bail you out is totally unacceptable. BNSF needs to accept that it has both an obligation and an opportunity to provide programmed maintenance at a level that will optimize, rather than detract from, the efficiency and effective capacity of this important rail asset.

3. Coal Dust and the 2005 Derailments

In my opening verified statement I discussed the causes of the 2005 derailments in detail. See De Berg VS at 8-12 BNSF summarized this analysis in a single phrase: AECC argued "that coal dust in the ballast did not cause the derailments". BNSF

Argument at 1. This is an inadequate statement of my position. I said that:

> [T]he derailments resulted from a lack of adequate maintenance, perhaps elements of substandard construction,....and the failure of BNSF to protect train operations with temporary speed restrictions or removal of track from service until needed repairs could properly be made.

De Berg VS at 8. Failure to deal properly with ballast contaminates, which included coal dust, may have contributed to the derailments, but coal dust didn't appear to be more of a problem than any other contaminate.

BNSF claims that AECC's evidence "seeking to demonstrate that the 2005 derailments were caused by something other than coal dust ....is a red herring" because "BNSF has not claimed that coal dust was the sole cause of the 2005 derailments." But BNSF then asserts that "other contributing causes of the derailments are not relevant to these proceedings". BNSF Reply Argument at 14

I disagree. If this Board is to rule on the reasonableness of BNSF's coal dust tariff, it is very relevant that contaminates other than coal dust contributed to the two derailments. To suggest that coal dust is the only issue affecting the stability of track is incorrect. Any and all contaminates may contribute to the instability of a track structure, as may drainage issues, construction issues, and maintenance practices; they all play a role in instability. Controlling a portion of coal dust deposition 2/ will not eliminate unstable track issues, because track instability is a compound problem, and coal dust is only one potential cause of that problem.

BNSF claims that if BNSF had understood the effect of coal dust, it might have been able to prevent the derailments, but based on what it knew at the time its

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2/ AECC witness Nelson has informed me that measurable coal accumulations would continue to occur even if the BNSF requirements were implemented.

"maintenance and inspection practices at that time cannot be faulted." BNSF Reply Argument at 14-15. I strongly disagree.

In my opening verified statement at pp. 10-12 I explained the conditions that caused the derailments to happen, including lack of proper drainage, lagging ballast maintenance cycles, and failure to detect the problems through inspections and protect the track with slow orders until repairs could be made. The resultant derailments should have been no surprise to experienced trackmen. Blaming the derailments on some unknown characteristic of coal dust is a plain attempt by BNSF to avoid responsibility for its maintenance an inspection shortcomings.

BNSF claims that its [redacted]

Wide gauge in concrete ties is easily detected by visual observation on track inspection and by checking records of previous geometry car or other electronic track strength measurements. Wide gauge in concrete ties indicates a more serious problem lurking within the tie and ballast section. Degradation and the breaking down and failure of the tie from over stress or heavy concrete abrading from interaction with the ballast section is a well known problem, especially with the BNSF and former BN concrete ties. These actions of the concrete tie with the granite ballast will cause slurry that, when combined with water, will have the same effect on the integrity of the track structure as

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3/ [redacted]

other ballast contaminates. [redacted] ignores more serious problems that have manifested themselves and have showed their ugly head resulting in these two derailments. [redacted] Fundamentally, BNSF failed to adhere to the minimum FRA track inspection requirements as outlined in 49 CFR 213.1 which states:

> The requirements prescribed in this part apply to specific track conditions existing in isolation. Therefore, a combination of track conditions, none of which individually amounts to a deviation from the requirements in this part, may require remedial action to provide for safe operations over that track.

BNSF also cites a [redacted]

[redacted] In my opening verified statement, I said that the main cause of the derailments was a lack of maintenance and the failure of BNSF maintenance and inspection personnel to properly protect train operations with temporary speed

restrictions or removal of track from service until proper repairs can be made. De Berg VS at 10. [redacted] I have said repeatedly in these proceedings that BNSF's maintenance activities on the Joint Line failed to reflect the growth in traffic on the line.

Mr. Cech also claims that [redacted] BNSF is so focused on blaming coal dust that they will not allow any thinking on other contaminates to be

considered part of the problem. BNSF should take to heart Mr. Cech's comment

[redacted]

Track inspection is essential to providing a safe and economical track structure

I have never said and will never say that coal dust is not a ballast contaminate, but in the whole scheme of track structure integrity the savvy engineer or track man will consider all factors that lead to track degradation. This is critical on this Joint Line where tonnages accumulate at a rate of approximately six times more than on a more normal sub-division.

BNSF claims, citing witness Fox on page 6 of his verified statement in the BNSF opening, that based on how BNSF was performing and what BNSF knew up to the time of the derailments," BNSF's maintenance and inspection practices at the time cannot be faulted." BNSF Reply Argument at 14-15. This is truly a shocking statement from the person who, as Vice President Engineering at the time of the derailments, was responsible for "BNSF's efforts to provide safe, efficient, and reliable physical infrastructure, tracks, signal systems, bridges, tunnels, and buildings." Fox VS at 2. Maintenance and inspection practices are supposed to keep a rail line in operation and the trains on the track. BNSF's maintenance and inspection practices failed to do so, resulting in two derailments that caused tremendous inconvenience and expense to the shippers who use the Joint Line. BNSF should certainly be "faulted" for that.

In my opening verified statement, I described how several features of the two derailment sites contributed to the derailments: accumulation of water due to drainage problems, inadequate ballast maintenance, abrupt changes in track modulus, and failure to detect these problems through inspections. De Berg VS at 10-12. Mr. VanHook, in

his reply verified statement, discusses "four common factors that they [AECC witness Nelson and I] believe implicate causes other than coal dust: [redacted]

[redacted]

VanHook Reply VS at 12.

Mr. VanHook's discussion is confusing, because the four "common factors" he refers to are not the same factors that I referred to in the portion of my statement that he cites:

- Mr. VanHook does not mention either inadequate ballast maintenance or inspection failures, which I believe are very important to understanding why the derailments happened, for the reasons discussed in my original statement.
- Mr. VanHook refers to profile position and construction quality problems, which I did not refer to in the portion of my statement that he cites. However, I did say (at p. 8 of my original statement) that "perhaps elements of substandard construction" contributed to the derailments.

Nevertheless, I will respond to Mr. VanHook's claims.

Mr. Van Hooks denies that "profile position and 'slack action' without more were a causal factor of the derailments", because BNSF, as well as other railroads all over North America, have numerous locations with profile positions similar to these." VanHook Reply VS at 13. Whether many railroads across the North American landscape have similar profile positions is immaterial to whether profile position at these two locations contributed to the derailments. When the track structure has been weakened, as it was at these locations because of inadequate ballast maintenance, drainage problems, and so forth, any dynamic action can adversely affect the stability of the track structure. The fact that one derailment location had wide gauge is an indication that lateral forces were already at work, and any downhill force (even moderate slack action) would be a

factor in overstressing the track structure and hence a factor in the cause of the derailment.

In his discussion of profile position Mr. VanHook throws in a mention of locomotive sand and says that it is not "credible" to say that "locomotive sand in the ballast produced the track instability". VanHook Reply VS at 13. I did not attribute the derailments to the presence of locomotive sand, 4/ but it is foolish for Mr. VanHook to say that locomotive sand could not produce track instability. As I discussed in my opening statement, locomotive sand is one source of ballast fouling. See De Berg VS at 3, 6. On a long ascent, locomotive sanding may be used for added traction. While pulling hard, locomotive sand is distributed on top of the rails by the locomotives front and rear, is crushed by the locomotives' driving wheels, and the powdery crushed sand is dropped into the ballast section. This powdery silica, when mixed with moisture, creates very abrasive slurry and contributes to ballast fouling. Crushed locomotive traction sand will add to the ballast fouling in a major way, and the powder will be a large contributor to ballast degradation and track instability. Even if it were true (which it is not) that "Coal dust is known to be a far worse ballast fouling agent than locomotive sand" (VanHook Reply VS at 13) it would not be prudent to ignore this source of ballast fouling. This is another example of BNSF's overemphasis on coal dust leading it to ignore other maintenance issues.

With respect to drainage, which I identified as a contributing cause of the derailments, Mr. VanHook claims that this is "based largely on selective use of

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4/ I understand that AECC witness Nelson has documented from BNSF's discovery materials that prior to the derailments BNSF made extensive use of locomotive sand at and south of the point of the UP derailment, and that BNSF has identified locomotive sand as a significant component of the undercutter waste at that derailment location.

documents and photographs that are not necessarily indicative of conditions at these particular locations or conditions that existed at the time of the derailments." VanHook Reply VS at 13. This is dead wrong. I made an inspection of both derailment locations, supplemented by review of track charts and other documents. My conclusion, based on that first-hand knowledge, was stated in my opening statement:

> These two locations have characteristics that collect water and accelerate deterioration of the structure due to excess water from surface runoff. The long grades south of both locations allow the water to run downhill and saturate the sub-grade. In the case of MP63.2 the water ponded at the turnout due to the absence of proper drainage. At MP75.3, water accumulated at the back wall of Bridge 75.2.

De Berg VS at 10. Mr. VanHook does not dispute these observations, and he should be familiar with such conditions.

Instead, Mr. VanHook tries to use the existence of drainage problems to support his claim that coal dust caused both derailments, because "[t]he problem with coal dust is that it impedes drainage", "leading to track instability." VanHook Reply VS at 13. Again, Mr. VanHook's focus on coal dust keeps him from seeing the obvious. The physical conditions that I observed at the derailment sites, down grades and impediments to drainage, would cause water problems even if there were no coal dust present. If fouled ballast becomes water-soaked, this will lead to track instability, whether the ballast is fouled by coal dust, degraded ballast particles, locomotive sand, blowing dirt, dust from abraded concrete ties, or whatever. Even if it were possible to rid the Joint Line entirely of coal dust, these locations would require constant inspections and effective maintenance to prevent the track from becoming unstable.

Although Mr. Van Hook agrees "that there can be track modulus issues where the track structure changes from concrete ties to wood ties", he does not believe that track

modulus was a factor in these derailments, because BNSF and its predecessor BN are "the industry leaders in the use of concrete ties, have been well aware of this potential issue and has addressed the issue by modifications of mixing wood and concrete ties where they interface." VanHook Reply VS at 13. Such practices can be useful in reducing the effects of changes in track modulus, but Mr. VanHook does not testify that these measures were in place at the derailment locations in May 2005, and even if they were, it is unlikely they would entirely eliminate the effect of changes in track modulus. Furthermore, Mr. VanHook only talks about the transition from concrete ties to/from wood ties; he doesn't address the fact that at the bridge the modulus change is from the transition between the concrete bridge structure and the subgrade.

When a track structure has been weakened to begin with by other factors such as I have described, track modulus no longer can be relied upon as a stabilizing factor for the track structure as it had before being compromised. Based on my observations and analysis, the interface between the wood ties and concrete ties and the bridge deck and the concrete ties had been compromised by the unstable track conditions, and soft track modulus was one of the causes of both derailments.

With respect to construction quality problems as a possible cause of the derailments, Mr. Van Hook claims that this could not be the case, because when the lines were engineered and constructed, BNSF consulted with outside experts to assure that they were properly designed and consulted. Van Hook Reply VS at 14. This is what anyone in this position would do, but I note that Mr. VanHook's remarks deal with the Joint Line as a whole; he does not address the specific locations where the derailments occurred.

During my March field inspection I noted excessive moisture at the sub-grade and sub-ballast interface. On grades, water was migrating downhill along this interface, as it is supposed to do, but moisture was also penetrating the sub-ballast at a number of locations and weakening the sub-grade. The two derailment locations in particular could not avoid the accumulated downhill moisture when that moisture bumped up against the south end of the Cheyenne River Bridge and the turnout for the setout track. When an excessive amount of moisture accumulates in the sub-grade the track structure weakens. The scoria sub-ballast is actually a poor selection for sub-ballast, but it's cheap and plentiful.

Finally, Mr. Van Hook claims that AECC (which in this context must include me) is not "really trying to understand the causes of the derailments". VanHook Reply at 14. On the contrary, it seems clear to me that BNSF is so committed to blaming coal dust for the derailments and all its other maintenance challenges that it closes its eyes to factors like blocked drainage, lagging ballast maintenance, track modulus changes, sources of ballast fouling other than coal dust, slack action on long ascents, and – perhaps most important – failures of track inspectors to catch the track instability in time to protect the track and repair the problems.

4. Coal Dust and Service Interruptions

BNSF contends that AECC's analyses "ignore the costs of possible service interruptions caused by coal dust fouling and they ignore the impact of increased maintenance on PRB rail capacity that is already tight." BNSF Reply Argument at 16-17. See, also, Id. at 17-18; VanHook Reply VS at 24-25. This is incorrect. BNSF has not taken into consideration the "extraordinary maintenance" that needs to be performed.

There is an unfortunate tendency to regard the level of maintenance that reflects historical tonnage as "normal". The Joint Line traffic keeps growing, and "normal" changes as tonnage grows, "extraordinary" then needs to be recognized as the new "normal" to be addressed in new maintenance procedures and times to perform those maintenance procedures. The maintenance effort needs to grow with the traffic; otherwise service and efficiency suffer.

BNSF's counsel is incorrect that "adding capacity just to be able to maintain the existing network is clearly not an appropriate solution to the coal dust problem". BNSF Reply Argument at 18. Failing to build adequate capacity for maintenance functions into a high density system moving large volumes of tonnage is a fatal flaw and reflects a very poor corporate philosophy. You need to build your infrastructure to accommodate the traffic you will serve in a safe and efficient manner, and this includes accommodating required maintenance of the infrastructure. BNSF's myopic philosophy and poor performance on maintenance may cause it to consume more capacity while performing maintenance than would an efficient railroad, but this does not form a valid rationale for BNSF to simply assign responsibility for coal dust to shippers irrespective of cost..

BNSF specifically needs to address the fact that carrying exceptional amounts of tonnage far beyond what anyone else is doing in North America requires a well-planned and executed maintenance plan that makes efficient use of capacity. Obviously, BNSF needs to design the infrastructure to allow adequate maintenance to be performed or risk losing capacity when maintenance is required. BNSF also needs to provide the levels of maintenance activities required to adequately service the needs of their customers as the line matures while tonnages continue to increase.

5. Track Has Memory

In my opening statement, in describing my inspection of the two derailment locations, I made reference to a phenomenon known as "track memory". I said:

> [T]he on-site inspections were very helpful for me in understanding the causes of these accidents, even though years have passed. Many times while inspecting track a qualified inspector will recognize what is called track memory: no matter what maintenance practice you perform, the track responds over time in recreating the problem you may have been trying to correct. At derailment site 1 the new track 1 adjacent to the old track 1 has evidence of memory of sub grade short comings by showing irregular surface conditions on new track 1 opposite the POD ("Point of Derailment") on old track 1. There are many times by observing the track memory conditions that a qualified trackman can ascertain the success of prior maintenance activities. In today's world many track maintenance people are inexperienced or unaware of the story track memory tells.

De Berg VS at 9. Mr. Van Hook is either one of those people who are unaware of the story that track memory tells, or he finds it useful to pretend to be.

Although I discussed track memory in my verified statement, Mr. Van Hook refers to an oral comment that someone else told him I had made about track memory. He then made his own inspection and reviewed a recent geometry car report, "which confirmed that the track surface at that time was well within normal limits." Van Hook Reply VS at 15.

Mr. VanHook's statements are irrelevant to my comments about track memory. I did not say that the surface irregularities in the track were outside of any normal limits, so the geometry car readings are not a surprise. What I said was that there was visual evidence of underlying causes of track irregularities, which I as a trained track specialist observed, and which helped me in my efforts to understand what happened in May 2005. Track memory means that the sub-grade or track structure tends to assume a geometry

that mimics what was there in the past. The mimic itself is only a telltale of what was once there and in no way depicts a current defect, as Mr. VanHook apparently thought it did. Many folks don't understand this terminology and misinterpret the statement as Mr. Van Hook did. Having an understanding of what a track memory represents is a wonderful tool in trying to understand what is going on with a segment of track.

Mr. VanHook also disputes my comment about track memory because, he says, "BNSF added a new main track 1 with centers of 35 feet from former main track 1on which the derailment occurred." VanHook Reply VS at 15-16. I am well aware that new track 1 is adjacent to the old track 1 on which the derailment occurred. I said this in my opening verified statement, at p. 9. What I saw and understood from spending many years evaluating track conditions and planning for proper maintenance was that the new track shows irregular surface conditions that evidence sub-grade shortcomings opposite the point of derailment on old track 1. Even though the new track 1 was constructed at 35 foot track centers, it was constructed with similar track design parameters. It's my conclusion that new track 1 is experiencing the same problems as old track 1, as nothing is significantly different in how the new track 1 is performing. It may not make exceptions with geometry car tests, but new track 1 is showing similar performance issues as old track 1. The memory comment as it pertains to new track 1 only reflects that there continues to be issues in this same general area as old track1and the sub-grade performance is telling me that.

Track memory is a useful way to stop and observe what has happened and what is happening and helps the experienced trackman in evaluating track performance. From

his comments I don't think Mr. Van Hook truly understands the value of studying track and observing what the track is telling you.

6. Exceptions Observed Before The Derailments

I did not expressly base my analysis of the causes of the 2005 derailments on FRA inspections, but such inspections can indeed be a good source of information about possible track problems. Mr. Van Hook disputes the analysis that WCTL/CCCS made of FRA inspection data in their Appendix B at 8-13, and he says that "[t]he fact that some defects are found in FRA inspections does not mean that a railroad is negligently inspecting or maintaining the railroad." VanHook Reply VS at 18. I don't disagree with that statement as a generality, but that does not render FRA inspection reports meaningless.

FRA track inspectors have a role to play in the total scheme of maintaining track safely. They will note exceptions and record those exceptions in their inspection of the track. Exceptions are not necessarily defects, but the existence of exceptions usually means that there is an emerging or reoccurring problem, and the problem needs to be addressed. FRA inspectors cannot write a defect unless that the condition exceeds the minimum requirements for that type of defect. If they note the presence of sub normal maintenance of a segment of track but there are no defects, they will issue exceptions and most times these exceptions will denote what the emerging problems are. I've always taken these exception reports or deviations as good information from a detailed on-the-ground track inspection and noted what was concerning the FRA inspector. One could come to the conclusion that the inspectors were noting the emerging or reoccurring problem of subpar maintenance on this high density line. Mr. VanHook does not

describe what actions BNSF took in response to such FRA exceptions before the derailments.

Mr. VanHook claims that "a better measure of the overall condition of a line segment is to compare the number of track defects identified by inspectors or track geometry car testing with railroad averages." VanHook Reply VS at 18. Mr. VanHook claims that such a comparison shows that "the Joint line was well maintained in 2003 and 2004". Id. at 19. I suggest that these good results were more an indication of dry weather conditions for those years than an indication of good track maintenance. I have always enjoyed better track conditions when moisture conditions were normal or sub normal. The fact that the derailments occurred when the dry spell ended tends to support this suggestion. If anything, the extended dry period prior to 2005 may have been keeping at bay track stability problems that would have been more evident sooner had precipitation been at normal levels prior to 2005. As AECC witness Nelson demonstrated in his reply VS, precipitation prior to the derailments simply represented a return to near-normal conditions, not any type of extraordinary event.

7. The Significance Of Catch-Up Maintenance.

I did not base my conclusions about BNSF's pre-derailment maintenance of the Joint Line on the fact that BNSF increased maintenance after the derailments, but I feel I have to respond to Mr. VanHook's claim that increased maintenance after the derailments "is not indicative of deferred maintenance." VanHook Reply VS at 21. What this statement shows is that BNSF is trying to create a new and narrow definition of deferred maintenance so that it can claim it didn't do that. Mr. VanHook (citing Mr. Fox) claims that BNSF increased maintenance after the derailments because it discovered that "coal

dust was a larger problem than BNSF had previously thought", and this "led BNSF to undertake additional maintenance and inspection to deal with the coal dust problem." Id. As I've made clear in this and my previous statements, I believe that BNSF is wrong to blame all its maintenance problems on coal dust, but within the context of BNSF's blame-everything-on-coal-dust mindset, this statement supports my conclusion that BNSF was not maintaining the Joint Line track adequately before the two derailments occurred. Performing increased maintenance because you discover that your maintenance in prior years was inadequate, is the universal understanding of what "deferred maintenance" means.

I don't fault BNSF for increasing maintenance after the derailments. I do fault them for not mobilizing a sufficient effort to catch up on deferred maintenance until the two disasters occurred. I also fault BNSF for focusing excessively on coal dust, as though it were the only ballast contaminate, and as though forcing shippers to further control coal dust would solve all of their problems, which it would not. To operate a heavy haul railroad, BNSF should have programmed maintenance that addresses all sources of ballast fouling, and that ensures the safe and efficient performance of all components of the track structure from the sub-grade right up to the top of rail.

8. Experience and Research In Evaluating Railroad Maintenance

In his Reply VS, UP witness McCulloch acknowledges in his Conclusion, page 10, that he respects my railroad experience, but he notes that I did not refer to any new research regarding coal dust. As a matter of fact, I have reviewed quite a bit of research on the issue of coal dust, and together with my extensive track performance experience, this research confirms my conclusion that coal dust is not the only ballast contaminate

that one needs to be concerned about or address. The whole issue of ballast contaminates, ballast section failure, and track structure failure is a complex issue in which all factors need to be taken into account. One should not limit oneself to just what they think is (or wish to portray as) the major issue. I've studied many locations of track structure and ballast section failures, and I have researched what causes them and what methods may be used to fix them. I have made the adjustments necessary to effect success, and I do not limit my comments to just one view as to failures. I am very familiar with coal dust as well as the other ballast contaminates and the role each plays in failures relating to track and ballast failures.

Research can lead you astray, particularly if you lack adequate real world experience, or are using research to "prove" a predetermined position. For example, in the rebuttal statement of AECC witness Nelson, he demonstrates how Mr. McCulloch's testimony regarding the importance of the cubic volume (as opposed to the weight) of ballast contaminates refutes the stated conclusions of BNSF witness Tutumluer. I agree with witness Nelson that it is meaningless to compare the performance of ballast that is fully fouled by coal dust to ballast that is only partially fouled by other materials, and I therefore place no stock in witness Tutumluer's research.

VERIFICATION

I, Douglas G. De Berg, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this verified statement.

Douglas G. De Berg

Executed on May 28, 2010

REBUTTAL
VERIFIED STATEMENT
OF
MICHAEL A. NELSON

My name is Michael A. Nelson. I am a transportation systems analyst with 30 years of experience in railroad competition and coal transportation. A summary of my experience is provided in my verified statement contained in the Opening Evidence and Argument submitted by Arkansas Electric Cooperative Corporation (AECC).

On behalf of AECC, I have been asked to comment on the reply evidence submitted by BNSF Railway (BNSF) and Union Pacific Railroad (UP).

UP's evidence is largely informative, and in several instances is useful in advancing the development of a consistent and fact-based view of the coal dust issue and the merits of the coal dust provisions of the BNSF Tariff. While this rebuttal testimony identifies and addresses a small number of specific problems in UP's reply argument and evidence, UP's bottom line is fundamentally consistent with AECC's:

- UP is seriously concerned with coal dust and its potential effects on rail operations;[1]
- UP believes "all stakeholders should be incentivized to develop the lowest cost approach";[2]
- UP encourages voluntary actions to control the deposition of coal dust;[3] and,
- UP is actively seeking to identify and develop cost-effective approaches to controlling coal dust;[4] but,

[1] UP Reply Argument at 3.
[2] UP Reply Argument at 21.
[3] UP Reply Argument at 21.
[4] UP Reply VS Glass at 5.

- UP is unequivocally opposed to the imposition of BNSF's coal dust requirements on its traffic.[5]

UP's witnesses do not dispute many of the fundamental findings reached in my opening VS.

In contrast to UP, BNSF presses forward with two inconsistent theories in arguing that the Board should find the BNSF Tariff to be reasonable:

- BNSF argues that the Board should disregard standard cost-benefit analysis, and approve the Tariff because coal dust supposedly poses an otherwise unmanageable threat to the integrity of the rail system and PRB coal supply; or,
- BNSF argues that the Board should adopt a cost-benefit analysis, but base that analysis on values that BNSF did not submit to the Board or to shippers until BNSF's reply (i.e., only after the BNSF's belated recognition that the public interest will not permit the imposition on shippers of costs greater than the savings the railroads would achieve).

As shown in further detail below, neither of these theories withstands scrutiny.

BNSF presents a series of witnesses who purport to criticize numerous aspects of my opening VS. While the testimony of BNSF's reply witnesses is extensive, a closer inspection indicates that much of it disregards and is inconsistent with hard evidence that BNSF itself has developed. Largely untethered by facts, BNSF's arguments in many instances meet themselves coming and going with blatant inconsistency.

For example, BNSF maintains that coal dust blowing from the tops of railcars is the primary source of ballast contamination, but never explains the large discrepancy between the amount of coal measured by its dustfall monitoring system and the amount of coal it claims is lost. If the available coal-loss data are accurate, most fugitive coal is

[5] UP Reply Argument at 17.

not being lost through the airborne suspension of dust that is the sole focus of BNSF's monitoring and control efforts.[6]

BNSF also never explains the oft-repeated observations of its own witnesses that the deposition of dust on switches and bridges tends to be much more intensive than the deposition of dust on other rail infrastructure. When did switches and bridges become "dust magnets"?

As described in my Reply VS and documented further herein, BNSF's commitment to blame fugitive coal dust for all its maintenance problems, and to place responsibility for fugitive coal dust entirely on coal shippers, has caused it to ignore abundant evidence that the fugitive coal problems about which it complains are largely the result of maintenance and operating decisions made by BNSF itself. The evidence indicates that substantial quantities of fugitive coal result from the vibration of cars caused by rough track, modulus changes, and slack action, as well as from excessive train speeds on the descending sides of "big sag" locations. Additional examples of BNSF's self-contradictory arguments are presented below, and in Exhibit 1.

BNSF advances numerous additional erroneous arguments and assertions that appear in the reply statements of its witnesses. These errors and inconsistencies in BNSF's reply are symptomatic of the result-driven nature of BNSF's efforts over more than 5 years to get shippers to apply toppers to PRB coal shipments, irrespective of the fact that, as discussed in my opening VS, BNSF's own data prior to its reply filing in this proceeding have shown consistently that [redacted]

[6] Indeed, as discussed in further detail below, [redacted]

This rebuttal testimony reviews relevant facts and data, and attempts to synthesize them into a consistent and coherent fact-based view of coal dust issues that corrects the errors and inconsistencies advanced by BNSF and its reply witnesses. It begins by examining the threshold question of whether the monitoring system proposed by BNSF reliably measures the deposition of fugitive coal on rail ballast. It demonstrates that the BNSF monitoring system does not do so, and only accounts for a small portion of the fugitive coal that accumulates on rail ballast. It then illustrates multiple ways in which the actions of BNSF create or exacerbate the depositions of fugitive coal on rail ballast for which BNSF seeks to assign responsibility to shippers.

This testimony then reviews a key area of agreement among reply witnesses regarding the overriding importance of the cubic volume (as opposed to the weight) of ballast foulants. This agreement voids completely the study upon which BNSF has relied in its assertions that coal dust is intrinsically more damaging than are other types of ballast foulants.

This testimony then responds to BNSF's challenge to the finding in my opening VS that factors other than coal dust were primarily responsible for the Joint Line derailments of May 2005. Although BNSF claims that the current proceeding does not involve the 2005 derailments, the sole basis that BNSF asserts for its claims that coal dust poses unmanageable threats to the stability of the rail network and PRB coal supply is its unsupported assertion that coal dust caused those derailments. This rebuttal testimony demonstrates that BNSF's claims are vacuous, and cannot legitimately be used to bypass the need to subject BNSF's coal dust requirements to a proper cost-benefit analysis.

This testimony then reviews the cost-benefit analysis offered in reply by BNSF, which concluded - inconsistent with [redacted] - that the benefits achieved from the application of toppers would exceed the costs. This testimony highlights the unrealistic assumptions underlying BNSF's finding, and reaffirms the conclusion of my opening VS that the application of toppers would not be cost-effective. It discusses the small number of other situations where toppers have been applied, and various other issues in the railroad replies not otherwise addressed. It concludes with a synthesis outlining avenues through which cost-effective reductions in fugitive coal levels can be pursued.

1. BNSF's Dust Monitoring System Does Not Reliably Measure the Deposition of Coal on Rail Ballast

The coal dust reduction program that BNSF has designed and seeks to impose on shippers depends on BNSF's ability to measure with reasonable accuracy the amount of fugitive coal dust that each train deposits onto the track, so that BNSF can determine whether or not its program is achieving its goal of reducing the amount of ballast fouling caused by coal dust. In fact, the evidence is clear that BNSF's Track Side Monitoring (TSM) stations and their e-samplers do not perform adequately on this fundamental requirement.

On page 3 of his reply VS, BNSF witness Emmitt asserts that the airborne coal dust measured by BNSF's trackside monitors is a "strong covariate" of the coal being deposited in the ballast. This claim addresses a central issue in the assessment of the reasonableness of BNSF's planned measurement program – i.e., the ability to determine whether the amount of coal dust deposited on the track is being reduced.

This key assertion by witness Emmitt is both troubling and suspect because witness Emmitt's own testimony indicates that he cannot possibly know whether this statement is true. In statistics and in the dictionary, the term "covariate" has a very specific meaning – i.e., "any of two or more random variables exhibiting correlated variation."[7] Witness Emmitt cannot know whether TSM readings and actual dustfall "exhibit correlated variation" because he never studied or measured that relationship. He muses (on page 4 of his reply VS) that "(i)t would be...interesting...to correlate coal dust measured at a TSM with the specific amount of coal dust dropping directly onto the tracks or shoulders of the track structure", but he concedes that he did not make such a study. Not having performed such an analysis, his assertion that TSM readings and actual dust deposition are covariates is no more than an untested hypothesis, presented in language that falsely conveys credibility it has not earned.

In the absence of proof, witness Emmitt asserts[8] that it is common sense that "when the wind blows small dust particles 60 feet away from the track", where the e-samplers are located, it also blows off "larger particles" that "fall onto the right of way and get deposited directly into the ballast." The available evidence in this proceeding - including witness Emmitt's dustfall and TSM data, and the testimony of other BNSF witnesses - shows that "common sense" does not support witness Emmitt's "covariates" hypothesis for two sets of reasons. First, the erratic patterns observable in the TSM data do not match available information regarding coal deposition patterns. Second, the dustfall data indicate that most of the fugitive coal that lands on ballast does so through processes other than the airborne suspension measured by the TSM, so the "covariates"

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[7] See http://www.merriam-webster.com/dictionary/covariate .
[8] BNSF Reply VS Emmitt at 3.

hypothesis is extrapolating from a basis that forms a comparatively small fraction of the total fugitive coal to which it is applied.

(a) TSM Data vs. Deposition Patterns

My opening VS contained extensive documentation of the instability of the dust values measured by the TSM for individual trains. It cited, for example, how the measured dust value differs depending upon [redacted] when it passes the trackside monitor.[9] There is no basis for believing that the actual deposition of coal dust on rail ballast is lower for [redacted] than it is for [redacted] [redacted] (as shown in the TSM data). Indeed, with winds along the Joint Line blowing predominantly from the west, [redacted] if anything, have a somewhat greater opportunity to deposit coal dust on rail ballast than do [redacted][10]

Furthermore, the TSMs sometimes record dust being generated by [redacted] [redacted],[11] but such trains shouldn't be depositing any coal at all. More generally, there is no reason to believe the actual deposition of coal dust on rail ballast follows the erratic patterns observable in the dust values.

In my opening VS I identified 11 specific instability problems observable in the TSM data, including those mentioned above. BNSF apparently has no explanation for such profoundly inaccurate results, because it failed to respond to the issues I raised on this subject in my opening VS.

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[9] AECC Opening VS Nelson at 30.

[10] Assuming the toe of the ballast on the eastern side of the right-of-way at MP 90.7 is approximately 11 feet east of the centerline of Main 1, and that the wind normally blows from west to east, dust from loaded trains moving south on Main 1 potentially could land on a band of ballast west of the access road (as shown on page 6 of witness Emmitt's reply VS) that is 11 feet wide, [redacted]

[11] See BNSF COALDUST 0020582.

Perhaps most telling, however, is the apparent inconsistency between observed changes in dust measures and dust deposition over time. The 90th percentile dusting values from 2008 shown in witness Emmitt's Exhibit 4 are substantially lower than the [redacted][12] This appears to reflect a substantial [redacted], but BNSF complains that coal deposition is continuing largely unabated. It appears that either [redacted] to reduce fugitive coal dust, or witness Emmitt's dust readings do not reliably track the actual depositions of coal dust that are of concern to BNSF.

(b) Fugitive Coal vs. Dustfall

Data from witness Emmitt's dustfall collectors indicate that [redacted]. Specifically, using data contained in BNSF COALDUST 0082798[13] for the array of dustfall collectors at MP 90.7,[14] I have estimated the dustfall across the entire cross-section of the right-of way at that location. The development of this information, which is contained in my Workpaper 1, is based on the average rate of dust deposition for each collector over the most recent 12-month period for which data are available [redacted][15] Given the average rate of dust deposition for each collector, I assume only that the rate of dust deposition between two collectors can reasonably be approximated by a straight-line interpolation

[12] See BNSF COALDUST 0021307.
[13] Contained in BNSF Reply Argument, Appendix B, CD1 (Emmitt).
[14] See Reply VS Emmitt at 6.
[15] In the very small number of instances where the BNSF data source indicates that the measurement for a given collector in a given month is missing or unreliable, I use as a proxy the measurement for the same collector and the same month from the preceding year.

between the two, so that, for example, the average deposition rate in the area between Dust Jar 1 and Dust Jar 2 is the average of the rates observed at those two points. Using the area between Dust Jar 4 (11 feet east of the centerline of Main 1) and Dust Jar 7 (9 feet west of the centerline of Main 3) as a close approximation of the area over which fugitive coal dust could contribute to track ballast fouling, witness Emmitt's dustfall data show the following deposition pattern:

Portion of Cross-Section	Dustfall (pounds per route-foot/month)
East of track ballast	[redacted]
Track ballast	[redacted]
West of track ballast	[redacted]
Total	[redacted]

These data indicate that the percentage of coal leaving the tops of railcars in airborne suspension – i.e., subject to detection and measurement by the TSM – that actually lands on the track ballast is [redacted]

These data also reveal a substantial discrepancy between [redacted] [16] but apparently has elected not to attempt any type of reconciliation. Basically, the quantity of coal dust measured by the collectors [redacted]

[16] See BNSF COALDUST 0034270.

[redacted] However, using the 225 pounds per car loss measured in the study cited by UP, and the passing train volume figures assumed in the BNSF analysis, the quantity of fugitive coal is [redacted] Put another way, only abou[redacted] coal that leaves the tops of railcars is deposited on the right-of-way via the airborne suspension of dust measured by the TSM. While it may be reasonable to assume that [redacted] falls onto the track ballast from the cars, if it does so it is through methods that do not involve airborne suspension.[19] Combined with the previous finding that [redacted] the net result is that airborne dust, which is all that is measured by the BNSF monitoring program, [redacted] of the coal that actually lands on rail ballast.

Ultimately, the available evidence demonstrates that the monitoring system proposed by BNSF does not reliably measures the deposition of fugitive coal on rail ballast.

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[17] Developed using information presented in Workpaper 1 regarding "East Side" values from MP 88-113.5, inclusive.
[18] See BNSF COALDUST 0034270.
[19] As discussed further below, means other than airborne suspension include various specific mechanisms, including saltation, vibration from various forces and slack action.

2. **Railroad Operating and Maintenance Practices Largely Determine Coal Deposition**

Various information sources show that substantial depositions of fugitive coal result from specific railroad operating and maintenance practices, and not from the propensity of coal to issue dust under normal conditions. BNSF's evidence in this proceeding has consistently documented a pattern in which fugitive coal accumulates disproportionately on turnouts and bridges. Indeed, BNSF reply witness VanHook estimates that turnouts and bridges require removal of fugitive coal accumulations at a frequency [redacted][20]

My reply VS described how this pattern of deposition results from vibrations associated with modulus changes and/or maintenance practices. This is corroborated and illustrated by a video contained in BNSF's reply evidence, which shows {the sequential agitation of each car in a train as it passes over the south switch (at MP 91.15) of a set-out track.}[21] It is not possible to determine conclusively from this video whether the vibration and load disturbance result from a worn frog, a worn switch point, low joints, or some other specific cause. However, there is abundant evidence that such conditions, which produce unnecessary disturbance of the load, have been commonplace under BNSF's maintenance practices on the Joint Line.[22] Thus, BNSF's lax maintenance practices are contributing materially to the high concentrations of coal dust that BNSF observes in specific locations.[23]

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[20] BNSF Reply VS VanHook, Exhibit 7.
[21] BNSF Reply VS Emmitt, Exhibit 8, UP 6695.
[22] See Exhibit 3.
[23] Toward this end, it is interesting to note that the time period during which BNSF began to notice increased dust deposition corresponds to the time period during which it performed less maintenance than its own evidence indicates was required. For example, as shown in [redacted]

Witness Emmitt's dustfall monitors encompass an assortment of profile positions, and reveal that comparatively high levels of fugitive coal accumulate [redacted] Focusing on the dustfall observations from the most recent available month (October 2009) for the set of dust jars located immediately (9-13 feet) east of Main 1 at locations south of Reno Junction (i.e., so that the passing southbound ["eastbound", by convention in Joint Line dispatching] coal volumes are reasonably comparable), by far the greatest dustfall readings occur at [redacted]

A video contained in BNSF's reply highlights the apparent role of excessive train speed as a cause of fugitive coal deposition in such locations.[25] This video shows a

[redacted] year undercutting cycle identified in BNSF Reply VS VanHook, Exhibit 7.

[24] Data from October 2008 due to missing data from October 2009.

loaded train on the descending side of a big sag, approaching MP 75 just north of the Cheyenne River bridge. The train is generating a large cloud of dust, and time/distance relationships observable in the video indicate that the train is travelling approximately 50 mph.[26] Although BNSF (and even train crews) may view it as advantageous in the short term to build up downhill momentum to carry through the following ascent, such a practice may run contrary to the results of research, which indicates that in the longer term high speeds in heavy haul operations produce excessive wear and maintenance requirements.[27] High speeds also result in sharply increased aerodynamic pressures, which can dislodge from the tops of coal cars larger quantities of larger pieces of coal that land on the ballast. Indeed, aerodynamic pressures increase nonlinearly - at 50 mph air drag on a loaded coal gondola is about 56 percent higher than it is at 40 mph, and more than double what it is at 35 mph.[28] Prudent management would incorporate fugitive coal deposition as an additional consideration in the establishment of Maximum Authorized Speed (MAS) levels for PRB coal trains, and almost certainly would limit such speeds to less than 50 mph.

Evidence also suggests strongly that trainhandling issues, particularly related to slack action, play a considerable role in coal deposition. Above and beyond the discussions of slack action in my opening and reply statements, BNSF has known at least since 1926 that slack action tends to be most significant on longer, heavier trains.[29]

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[25] See BNSF Counsel's Exhibit 4 (March 16, 2010), CD1, BNSF 0022999. This video is also noteworthy because it shows, on the upwind side of the train, a telltale dust cloud indicative of coal falling directly from the tops of railcars onto the track ballast. The video does not indicate clearly whether this is resulting from rough track, slack action or some other specific cause.
[26] See Workpaper 2.
[27] See, for example, BNSF COALDUST 0019798+.
[28] See Workpaper 3.
[29] See http://thelibrary.springfield.missouri.org/lochist/frisco/magazines/fem_1926_03/fem_1926_03_16.pdf .

Moreover, materials produced by BNSF in discovery acknowledge that slack action contributes to [redacted]

A video provided by BNSF captures a comparatively gentle occurrence of slack action, in which a shock wave disturbs the top of the load on sequential cars as it propagates from the front to the rear of the train.[32] Evidence of more serious episodes of slack action was cited in my opening VS, including [redacted][33] The proposition that significant quantities of fugitive coal leave railcars in clumps, rather than as airborne dust, is further corroborated by the findings of the GPR study cited in my reply VS, which found distinct and isolated concentrations of fouling near the surface of the ballast (i.e., "shallow mudspots") rather than more broad and uniform pattern of fouling that reasonably could be expected from deposition of airborne dust.

In short, the available evidence illustrates multiple ways in which operating and maintenance issues solely under the purview of BNSF, including the presence of rough track, slack action and excessive speeds, create or exacerbate the depositions of fugitive coal on rail ballast for which BNSF seeks to assign responsibility to shippers. Whatever the effectiveness of toppers might be in controlling airborne dust releases from coal cars,

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[30] See BNSF COALDUST 0001871+. Even with the maintenance of bottom-dump cars that the railroads assert they have performed, there is no reason to believe that all seals are now so secure as to be impervious to vibration or slack action forces.

[31] See BNSF COALDUST 0021521. [redacted]

[32] See BNSF Counsel's Exhibit 4 (March 16, 2010), CD1, BNSF 0022995.

[33] See AECC Opening VS Nelson at 18, n26.

there is no reason to anticipate that the comparatively thin and fragile crust provided by low-water toppers will remain effective in the face of excessive aerodynamic, vibration and slack action forces to which PRB coal cars are currently subjected.

3. Unanimous Agreement on the Role of Cubic Volume Voids BNSF's Reliance on the Proposition that Coal Dust is More Damaging than Other Ballast Foulants

Although BNSF stated in its opening argument that coal dust was the worst ballast-fouling material, the only evidence it submitted to support that argument was a study by Prof. Tutumluer. In my Reply VS at pages 2-4, I showed that witness Tutumluer's conclusions were flawed, because he compared the performance of ballast fouled by coal dust with the performance of ballast fouled by other contaminants in tests involving equal weights of each contaminant. Fouling results from contaminants filling the voids in the ballast, so a proper comparison would be based on equal cubic volumes of different contaminants, not equal weights. Because coal dust is substantially less dense than the other contaminants witness Tutumluer studied, he was comparing the fouling effect of a large cubic volume of coal dust with a much smaller cubic volume of the other contaminants.

All the railroad reply witnesses who addressed this issue supported my position regarding the importance of accounting for the low density (i.e., high cubic volume per unit of weight) of coal dust in the fouling of rail ballast. UP reply witness McCulloch provides a lengthy discussion of the role of the cubic volume of ballast contaminants, rather than their weight, as the relevant indicator of ballast fouling for PRB coal. BNSF reply witness VanHook also mentions it.[34]

[34] BNSF Reply VS VanHook at 6.

Basically, there is no dispute in this proceeding regarding the way the filling of the voids in ballast constitutes fouling. While "percent by weight" in the past has provided a consistent method of quantifying ballast foulants, the comparatively low density of PRB coal relative to other foulants makes it appropriate, if not essential, to take into account density differences among ballast contaminants and their cubic volumes.

As described in detail in my Reply VS, this consideration voids the conclusions reached by BNSF witness Tutumluer regarding the allegedly harmful nature of coal dust relative to other ballast foulants. As explained by UP witness McCulloch, rail ballast may be fully fouled by coal dust at or near the 15 percent by weight level (let alone the 25 percent by weight level tested by witness Tutumluer).[35] This confirms the conclusion in my Reply VS that witness Tutumluer was improperly comparing ballast that was fully fouled with coal dust to ballast that was only partially fouled by the other substances, and that his findings reflect nothing more than the obvious proposition that fully fouled ballast is less stable than partially fouled ballast, especially when wet.[36]

With witness Tutumluer's study out of the picture, the lack of evidence to support BNSF's more extreme claims regarding the "pernicious" nature of coal dust is particularly apparent:

- On page 2, BNSF asserts that coal dust expands when exposed to water. The absence of a citation for this assertion is consistent with the fact that this has not

[35] Assuming that witness McCulloch is correct that coal dust substantially below the 25 percent by weight level produces fully fouled ballast while other ballast foulants do not, it appears unusual that witness Tutumluer made no mention of this, which should have been obvious during the testing he described.
[36] On page 14 and in Appendix A, BNSF tries to claims that it had no way to know that fully fouled ballast, when wet, may become unstable. As described in detail in my Reply VS at page 2, this is well-documented and common knowledge.

been demonstrated by a witness in this case, or, to the best of my knowledge, in any relevant literature.

- Also on page 2, BNSF asserts that even in very small quantities, coal dust can weaken the strength, stability and load-bearing capacity of rail ballast. Again, this ventures far from anything that has been demonstrated, and on its face is inconsistent with the fact that rail ballast on thousands of miles of track has been exposed to varying quantities of coal dust over periods of decades without any indication that it poses threats any more severe than those of other ballast fouling materials.

There simply is no evidence that coal as a ballast foulant is any more dangerous than any other foulant.

4. <u>BNSF Cannot Rely on the May 2005 PRB Derailments for Its Claims that Coal Dust Threatens Rail Network Stability and PRB Coal Supply</u>

BNSF relies in large part on the Joint Line derailments of May 2005 for its claims that coal dust poses unmanageable threats to the stability of the rail network and PRB coal supply. While BNSF reply witness VanHook asserts that this proceeding "...is not about determining cause of 2005 derailments", he simultaneously claims that instability caused by coal dust was shown in 2005 derailments. Witness VanHook cannot credibly claim that the 2005 derailments demonstrate anything about coal dust if he cannot provide an explanation of the role of coal dust in the derailments that is consistent with known facts.

In my opening VS I presented an analysis that concluded that factors other than coal dust were primarily responsible for the 2005 derailments. Witness VanHook makes

several attempts to refute my analysis, but these attempts fail, as discussed in detail below.

(a) Dust Accumulations and Profile Position at Derailment Locations

Mr. VanHook asserts it is "undeniable" that there were substantial accumulations of coal dust in and around the ballast in areas where the derailments occurred. Unfortunately, this is yet another of the critical assumptions underlying BNSF's proposed coal dust requirements that the Board and coal shippers are supposed to take on faith, because Mr. VanHook conspicuously cites no study, analysis or other authoritative source for this assertion. Indeed, even BNSF's plans to [redacted] have not yielded any data from which this claim could be substantiated.[37]

In its argument, BNSF attempts to rely on observations made by Division Engineer John Cech regarding the role of coal dust in the derailments, but this reliance is ill-founded. First and foremost, my analyses have never asserted or assumed that there was no coal dust at the points of derailments. Rather, my work has demonstrated that factors other than coal dust provide a much more reasonable explanation of the causes of the derailments. Moreover, as discussed above, available information regarding the pattern of coal dust distribution indicates that the concentration of coal dust was far lower at the points of derailment than at other locations. The issue is not whether coal dust was there, it is whether it reasonably can be cited as a cause of the derailments, which it cannot.

[37] [redacted]

It is important to note also that Mr. Cech's observations on coal dust are based on impressions, rather than data, and many on their face do not pertain to the derailment locations. Mr. Cech cites no compound analysis, and well not have know the now-recognized fact that notwithstanding its black appearance, only a small percentage of the material fouling PRB ballast is coal. Likewise, Mr. Cech references accumulations around switches, but apparently was not considering the role of vibration and modulus changes, rather than airborne suspension of coal dust, as the primary causes of the accumulations he observed. Indeed, the portion of his comments that address drainage and subgrade failures does not appear to address ballast fouling, but rather the surface accumulations of fugitive coal that may interfere with the ability of drainage ditches to keep surface water away from the subgrade under the track. That's a readily visible problem that I understand can normally be remedied through comparatively simple ditch maintenance, and is distinct from the "fouled ballast" issue.

Mr. Cech's reference to severe fouling at the locations of "much of the 2004 ballast work" doesn't even appear to relate to the derailment locations – neither of the derailment locations were undercut in 2004, so what he's saying appears to corroborate my finding that the biggest accumulations of coal dust were elsewhere. In addition, even if there were a high observed correlation between coal dust and subgrade failures, it wouldn't automatically connote causality. For example, high dust accumulations may materialize at the locations of fills, which tend to amplify wind velocity and aerodynamic pressures on passing trains. However, irrespective of coal dust, fills comprised of Wyoming clay may be susceptible to instability when wet, particularly if material preparation/compacting/etc. was substandard, as Mr. Cech himself has theorized.

Subgrade problems and coal dust accumulations can easily be correlated without having a causal connection.

In the absence of actual data, BNSF reply witness Emmitt's dustfall data provide the best available information regarding the likely accumulation of dust at the initial points of the May 2005 derailments. These data support the conclusion that the derailment sites most likely did not have an unusually large accumulation of coal dust.

Specifically, as indicated in my opening VS, both of the derailments occurred on the ascending side of big sags. Witness Emmitt's dustfall data include a sampling location (MP 98) that is on the ascending side of a big sag. At this location, the measured dustfall rate of 185.73 is virtually identical to the average of the five "unremarkable" profile locations (189.58), and far less than the average of the four readings from the descending sides of big sags (929.07) discussed previously. This is consistent with the fact that the trains tend to slow down on ascents, so the extreme aerodynamic pressures generated by high train speeds on descents are avoided.[38] In any event, witness Emmitt's data refute Mr. VanHook's unsupported assertion regarding the concentration of coal dust at the derailment locations.

In addition, Mr. VanHook appears to offer no meaningful response to the evidence presented in my opening VS regarding BNSF's use of [redacted]

[38] Indeed, at the time of the derailments there were signals at MP 75.3, so some loaded trains passing the initial point of the BNSF derailment may have been proceeding from a stand-still.
[39] See BNSF COALDUST 0016743.

[redacted] In short, witness VanHook's explanation of the derailments is inconsistent with BNSF's own evidence.

(b) Drainage

Witness VanHook offers a similarly ill-founded criticism of findings presented in AECC's opening evidence regarding drainage issues. He basically claims that the root problem is coal dust, because coal dust "impedes drainage". This simplistic claim is invalid for at least 5 reasons.

(1) As described above, the best available evidence indicates that the concentrations of coal dust at the derailment locations were [redacted]

(2) The drainage issues described by AECC involved infrastructure design/construction problems specific to the original points of the two derailments. Witness VanHook does not dispute the existence of these problems at these locations.

(3) The drainage issues AECC described involve runoff of water at the level of the subgrade, not drainage from within the ballast layer, where excessive fouling may well impede drainage in the manner witness VanHook references. Indeed, they involve situations where such surface water had the opportunity to run downhill for considerable distances and had done so without incident before reaching the infrastructure at the derailment locations.

(4) Witness VanHook offers no explanation for BNSF's decision to [redacted], which AECC identified as having been

constructed with inadequate drainage, if track instability problems at that location effectively were addressed by BNSF's subsequent efforts to remove coal dust.

(5) Witness VanHook offers no explanation of why BNSF should be excused from its obligations to ensure the adequacy of the design and performance of its drainage facilities.

(c) Track Modulus

Witness VanHook responds to AECC's observations regarding track modulus by noting BNSF's use of larger wood ties in transition areas between track using wood ties and track using concrete ties, and by citing BNSF's "extensive use and maintenance of concrete and wood ties on its high density PRB lines." Witness VanHook's comments do not address at all the situation at the site of the BNSF derailment, where the modulus change was associated with [redacted] [40] and had nothing to do with concrete vs. wood ties. At the site of the UP derailment, witness VanHook appears to agree that there was a was a change in track modulus, but his attempt to rely on BNSF's experience adds nothing to what UP already knew when UP identified [redacted] Further issues regarding BNSF's "use and maintenance of concrete…ties" are discussed below.

(d) Construction Quality

Witness VanHook falsely claims that AECC relied only on an email from BNSF Division Engineer John Cech in its identification of construction quality problems. In

[40] This is true of both of the scenarios surrounding the BNSF derailment, as described further in my opening VS at pages 9-10, including n16.

fact, AECC relied on several independent sources that corroborated Mr. Cech's observations, including the following:

- [redacted] (discussed above) was a specific construction quality problem that raised broader construction quality concerns;
- photographs from the site of the BNSF derailment showed [redacted] and,
- as discussed further below, photographs from the site of the BNSF derailment appear to show that the track [redacted].

More generally, even if this issue had not been identified by BNSF's own expert, a reasonable analyst would have legitimate reasons to raise construction quality questions, and certainly could observe easily that the segments where the derailments occurred were among the newer segments constructed. As discussed further below, concerns regarding construction quality issues at the derailment locations are corroborated fully by [redacted] which document construction quality problems on other recently-constructed track.

Contrary to Mr. VanHook's allegations, AECC never suggested the Joint Line as a whole was improperly constructed. Mr. VanHook's misleading rhetoric does not change the facts, which are that (a) BNSF's engineer identified [redacted]; (b) both derailments occurred on such segments; and (c) photographic evidence from those sites and others of similar vintage confirm the reasonableness of such [redacted] concerns.

(e) Probability Analysis

Witness VanHook takes issue with the assumptions in my probability analysis of the derailments that coal dust, drainage, and track modulus problems are uniformly distributed along the Joint Line. He does not seem to recognize that those assumptions were uniformly favorable to BNSF's position, and that if the computations had been extended to incorporate these factors, the resulting probability that the derailments could have occurred as they did under BNSF's theory would have been even smaller.

[redacted] are known to have existed at the derailment sites, so my assumption (for the purposes of the computation) that they also existed elsewhere on the Joint Line is giving BNSF the benefit of the doubt that these factors do not make the derailment sites any more unique than indicated by their shared [redacted] Given that the rest of the Joint Line is not as affected by [redacted] as are the derailment sites, fewer segments would have satisfied the criteria in the probability analysis, and the computed probability would have been even lower.

Similarly, the assumption that the distribution of coal dust on the Joint Line is uniform gives BNSF the benefit of the doubt because, as discussed above, the evidence indicates that coal dust accumulation on the [redacted] and on track with less remarkable profile characteristics. Any increased probability of derailment associated with coal dust would increase the probability of a derailment on the [redacted]

In this context, it is ironic for BNSF to criticize my probability analysis as "convoluted".[41] Even if the probability analysis were disregarded entirely, the simplest possible reading of BNSF's own dustfall data is that the derailment locations are at the [redacted] (in comparison to the derailment locations) without experiencing any derailments. Under these circumstances, it is highly implausible to blame coal dust for the derailments happening where they did (and not happening elsewhere on the Joint Line where there were [redacted]

BNSF has had 5 years to improve its understanding of the circumstances surrounding the derailments. Rather than accept the facts that it has gathered and move forward on that basis, BNSF has clung to the story it first told within days of the derailments – i.e., that the Joint Line was buried in coal dust, the coal dust got wet and the infrastructure fell apart. Apparently BNSF does not grasp the fact that this explanation of the derailments fits the data so poorly that it fails on the back of an envelope, even when BNSF is given the benefit of the doubt on multiple contributing factors.[42]

(f) Use of Photographs

While BNSF has made liberal use of photographs to portray the supposed extent of coal dust deposition and the purported need for remedial action, witness VanHook disparages and criticizes my discussion of photographs that document construction

[41] BNSF Reply VS VanHook at 14.

[42] It is noted that the UP derailment occurred at a [redacted] have been identified as locations where fugitive coal tends to accumulate. However, the evidence indicates that this deposition reflects coal leaving the car [redacted] and not from deposition of the airborne dust that is the crux of BNSF's theory and the subject of its coal dust requirements.

quality and maintenance issues for which BNSF, as the operator of the line, plainly bears sole responsibility. He begins with the mystifying assertion that "five-year old photographs" cannot "...be used to form reliable conclusions about the causes of the derailments." It does not take very much of the "convoluted" math about which he previously complained to determine that the derailments occurred (2010-2005=) 5 years ago. The photographs at issue were taken around the time of the derailments, and Mr. VanHook offers no rationale for ignoring the evidence they provide regarding actual conditions prevailing at that time.

I might have agreed with Mr. VanHook had he argued that most of the photos provided by BNSF in discovery were [redacted] I therefore relied to a considerable extent on the collection of photographs developed by [redacted] These photos, generally in full color, provide high-resolution views of many points that the BNSF photos do not cover.

The circumstances under which the [redacted] underscore their importance in the assessment of issues surrounding the derailments, and BNSF's performance as the rail carrier operating and maintaining the Joint Line. [redacted] was relevant to identifying and addressing the causes of the problems.

Mr. VanHook argues that photographs "...not taken at the derailment locations...are irrelevant for that reason." He does not explain why [redacted]

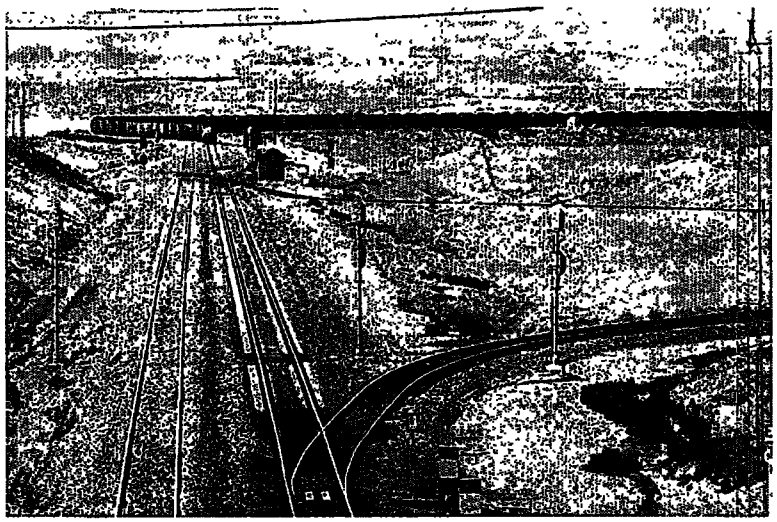
thought they were relevant.}} More to the point, he does not offer any evidence to dispute the substance of what those photographs reveal.

For example, the photograph at MP 26.5 shows [redacted] My opening testimony provided several observations regarding this photograph, including the fact that the [redacted]

In response, Mr. VanHook presents no evidence and no assertion that coal dust had anything to do with this mess. He does not dispute that the location is [redacted], and does not offer any alternative explanation for the conditions that are readily observable in the photograph. His only response is that because the tracks [redacted] he doesn't think anybody can draw any conclusions about drainage.

If BNSF's Chief Engineer – Systems Maintenance and Planning can't offer a meaningful substantive response to the commentary I provided on the conditions plainly depicted in the photo and readily discernible through public sources (let alone the corporate resources of BNSF), it is no wonder that questions abound regarding the adequacy of BNSF's Joint Line maintenance practices. In his position, which entails

responsibility for "development and implementation of a $1.5 billion annual capital maintenance budget and a $900 million budget for the engineering department",[43] Mr. VanHook has access to detailed design, construction and maintenance records, information systems and personnel, on top of 30 years of his own experience. His "See No Evil" defense lacks credibility, and acts as a de facto concession of the points raised in my opening statement. Further confirmation of the validity of those points is provided by a photograph of the ditch in question provided by an anonymous railfan (from a public road overpass):



As is plainly visible on the left side of the photo, there is no access road, and ruts resembling tire tracks have been cut into the lower portion of the embankment, introducing embankment material into the drainage area. The photo [redacted]

[43] BNSF Opening VS VanHook at 1-2.

[redacted] Nothing in Mr. VanHook's reply changes that.

Mr. VanHook makes an even more feeble objection to a photo I presented from the Reno Subdivision. Mr. VanHook concedes that the photograph [redacted]. He also concedes that BNSF does not use the type of procedure described by AECC witness DeBerg to ensure adequate ballast thickness is maintained.[44] However, his claim that BNSF's maintenance equipment ensures proper ballast thickness implicitly assumes that the maintenance equipment is being used. During the decade prior to the derailments, [redacted] If BNSF's maintenance practices were insufficient to [redacted] its efforts to blame coal shippers for its soft track issues are transparently irresponsible.

Failing to refute the content of the photographs, Mr. VanHook calls them "isolated", and claims that it is [redacted] Sample listings of such photographs and the issues they identify are presented in Exhibit 3.

[44] BNSF Reply VS VanHook at 21.

(g) [redacted]

[redacted]

In response, Mr. VanHook makes no claim that the dimensions are inaccurate or that the photo depicts some location other than the point of the BNSF derailment. Instead, he claims that [redacted] Not surprisingly, he does not mention the NTSB report on the 2005 Amtrak derailment in Home Valley, WA, which highlighted BNSF's maintenance shortcomings problems on busy track laid with concrete ties (without any coal dust present).[46]

Even if Mr. VanHook's [redacted] there is no excuse for BNSF to fail to detect such problems and to maintain the ties properly. Moreover, BNSF never explains how all of that [redacted] along with all of the ballast fines generated by the high levels of passing MGT, stay out of the "coal dust and water" mix to which it repeatedly ascribes all ballast fouling problems. Contrary to witness VanHook's arguments, BNSF plainly had a substandard [redacted] in place at the point of derailment.

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[45] See http://www.arema.org/eseries/scriptcontent/custom/e_arema/library/2003_Conference_Proceedings/0059.pdf.

[46] See http://www.ntsb.gov/publictn/2006/rab0603.pdf.

5. Cost/Benefit Analysis Shows That BNSF's Coal Dust Tariff Is Unjustified

On page 15, BNSF argues that comparative cost analysis is not the right way to assess the reasonableness of its coal dust requirements. This contention is not only unsupported, but also is voided by BNSF's own advocacy of "efficiency" considerations as determining factors.[47]

The costs of needed rail maintenance and capacity are certainly legitimate considerations, but in the public interest they are no more legitimate than are the costs that would be incurred by shippers to satisfy BNSF's requirements. BNSF has pressed forward with its requirements in the apparent hope that the Board will attach overriding significance to the costs BNSF incurs, irrespective of the impacts on shippers. That would be wholly inconsistent with the Board's mandate to administer the public interest, as opposed to BNSF's private interests.

On page 16, BNSF describes as "meaningless" the cost comparison presented in my opening VS, in part because it supposedly ignores the impact of increased maintenance needs on PRB rail capacity. The values I presented were drawn from BNSF's own studies, which purported to [redacted]

The cost-benefit analysis offered in reply [redacted] It is important to note that having

[47] BNSF Reply Argument at 15 and VS VanHook at 24.

benefits exceed costs is a necessary condition, but not a sufficient condition, to proceed along any given course of action regarding coal dust control. As indicated in my opening VS at page 28 n40, the action would also need to maximize the excess of benefits over costs. However, for the Tariff the analysis does not need to consider such issues, since

[redacted]

the cost-benefit analysis reaffirms the conclusion of my opening VS that the application of toppers would not be cost-effective.

(a) Costs

The railroad reply witnesses present anecdotal evidence suggesting that toppers may not be as costly as indicated in the railroads' earlier study. However, that study contemplated that costs would vary according to the circumstances at different mines, and the anecdotal evidence appears to fall within the expected range. Moreover, neither shippers nor the Board can have any confidence that the "introductory" pricing of a topping supplier seeking to establish a presence in this new market, especially during a recessionary period, will reflect fully the longer-term cost components captured in the railroads' study. In short, the railroads have provided no basis for relying on costs lower than those contained in the railroads' study. If anything, those estimates may need to be increased somewhat to account for general price inflation, though as a practical matter that has been minimal.

(b) Benefits – Joint Line Maintenance/Operational

The principal benefit from the use of toppers would be the reduction of Joint Line maintenance costs and operational impacts that could be achieved through reduced coal

deposition. Even before the [redacted][48] Essentially the same analytical framework was used by witness VanHook to develop the estimate presented in Exhibit 7 of his Reply VS.[49] In 2005, the annual maintenance cost impact of coal dust on the Joint Line estimated using this framework was [redacted]/year,[50] with the operational impacts of maintenance windows and slow orders adding [redacted] year, for a total of [redacted]; Mr. VanHook's estimates include annual maintenance cost impacts of [redacted] and operational impacts of [redacted] for a total of [redacted]

The specific numerical results produced by the framework reflect a series of implicit and explicit assumptions and data inputs. The differences between the 2005 estimate and witness VanHook's estimate can best be understood, and the reasonableness of Mr. VanHook's estimate can best be assessed, by reviewing those assumptions and data inputs.

Obviously, some underlying facts have changed that may affect the numerical results. For example, the numbers of track miles and turnouts are higher now than they were in 2005, and my estimate relies on the values for those parameters supplied by Mr.

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[48] See BNSF COALDUST 0015810. The fact that this document was composed before the Joint Line derailments confirms that BNSF from the outset viewed coal dust as a cost reduction issue. The entire purpose of the extra maintenance costs estimated in the framework is to ensure that track instability does not occur. The threat of track instability certainly contributes to the need for the measured incremental maintenance, but does not .provide "extra" benefits if the costs of incremental maintenance have properly been estimated.

[49] This discussion addresses the estimation of the cost impacts of fugitive coal dust on the Orin Subdivision (i.e., the Joint Line). Witness VanHook's methods of extrapolating these results to other trackage are discussed separately.

[50] The original reported result of $13,888,525 included a line item for a one-time, nonrecurring right-of-way cleanup cost of $640,000 (which itself appears to have been miscalculated, since 80,000 x 40 = 3,200,000, not 640,000). That line item properly was [redacted]

VanHook. Likewise, all else equal, general price inflation has added approximately 12 percent to unit costs since 2005. In addition, information developed since 2005 now permits greater accuracy in the development of estimates of rail cost savings that would be associated with the use of toppers. The reasonableness of specific elements of Mr. VanHook's estimate of incremental coal dust maintenance costs is examined below in light of these considerations, and a revised estimate is developed that corrects for the problems in Mr. VanHook's analysis that are identified.

Unit costs – One of the most striking features of [redacted] a figure that was somewhat higher than the figure used by UP and BNSF to apportion Joint Line maintenance costs.[51] Mr. VanHook's use of [redacted]/mile as the unit cost is unexplained and inconsistent with the available evidence.

In other categories, the amount of [redacted] my analysis generally assumes that unit costs from 2005 to 2010 increased by 12 percent, reflecting general price inflation. As discussed further below, for some line items I use the unit cost information provided by Mr. VanHook, and for some line items the unit costs I used, based on a 12 percent increase over 2005 levels, are higher that Mr. VanHook's.

[51] See BNSF COALDUST 0001642.

Undercutting requirements – Mr. VanHook's estimate assumes that [redacted] reasonably consistent with a value developed in my reply VS.[52] However, his use of a [redacted] First, BNSF's own data show that coal constitutes only [redacted] by volume of the undercutter waste on the Joint Line. Even this figure likely represents an upper bound on the percentage that coal forms of the material occupying the voids of fouled ballast, since the undercutter typically takes in materials sitting on top of the ballast that are not in the voids. Using the [redacted] figure as an upper bound for the purpose of this analysis, even if no coal were deposited on the ballast, BNSF would need to undercut every [redacted] years to ensure that the fouling of ballast was no more severe than it would be on a [redacted] year cycle with no toppers.

This leads to the second consideration, which is that, even with toppers, a substantial quantity of fugitive coal will still land on the ballast. As the study cited by UP found, an average of [redacted] pounds of coal will leave the top of each railcar even with a topper applied (compared to 225 pounds if no topper is used).[53] All else equal, fugitive coal will still accumulate at a rate approximately [redacted] of the rate at which it

[52] AECC Reply VS Nelson at 10. I believe that BNSF has further opportunities to reduce the need for undercutting in response to coal dust through more careful analysis of fugitive coal accumulation patterns and application of improved procedures, including GPR (as discussed in my reply VS), to target undercutting to the areas where it is needed. However, my analysis includes no adjustment that would reduce the estimated coal dust costs to reflect this consideration.

[53] Coal will also continue to leave the bottoms of railcars. This is discussed under turnout/bridge undercutting (below).

accumulates with no topper.[54] With only [redacted] percent (rather than 100 percent) of the fugitive coal accumulation eliminated by the topper, BNSF would need to undercut every [redacted] years to ensure that the fouling of ballast was no more severe than it would be on a [redacted] year cycle with no toppers.[55] This is the value used in the corrected estimate.

Due to witness VanHook's failure to account for [redacted] he has overstated (by about [redacted] percent) the size of the impact that the application of toppers would have on annual undercutting requirements. Combined with his apparent [redacted], Mr. VanHook's estimate of increased annual undercutting cost [redacted] is approximately [redacted]

Turnout/Bridge Undercutting – Mr. VanHook utilizes an estimate that turnouts and bridges need to be undercut on a cycle that is [redacted] my observation that vibration issues at turnouts and bridges cause the deposition of fugitive coal to be concentrated at such locations. Since vibration-related deposition, especially from the bottoms of cars, is not known to be susceptible to effective control through the application of toppers, my estimate preserves in the "topper" scenario the [redacted] In this category I have utilized [redacted] rather than the inflation adjusted

[54] Computed as [redacted]
[55] Computed as [redacted]

unit cost from 2005 to account for the possible higher unit costs of undercutting on bridges [redacted]

Ties, Insulated Joints, Frogs, Switches and Rails – [redacted]

For the purposes of my analysis I include requirements for these track components, but correct [redacted] I note that inclusion of these components, even as I have calculated them, may tend to overstate actual maintenance cost impacts.

Switch winterization (vacuum trucks) and switch failures – [redacted] My analysis adjusts the requirements from the 2005 estimate to account for the increased number of turnouts and [redacted]

Track availability (slow orders) – The 2005 estimate included [redacted] a central purpose of the incremental maintenance costs estimated in this analysis is to minimize or eliminate the occurrence of unforeseen events related to coal dust that would cause the need for a slow order in the first place.

[redacted] the infrastructure changes that have occurred on the Joint Line since the 2005 analysis, and that dramatically reduce the operational impact of slow orders. Subsequent to the 2005 analysis, the entire Joint Line became triple-tracked, so even if one track has to be taken out of service, two tracks remain to support high-capacity directional operations. Moreover, BNSF has built the new track and relocated existing track to produce 25' on-center separations between adjacent tracks.[56] This generally permits full-speed operation even when maintenance is being performed on an adjacent track.

On the basis of these considerations, [redacted] For the purposes of this analysis, I have used 50 percent of the 2005 estimate, adjusted to reflect general price inflation since 2005, as well as [redacted]

[56] BNSF Reply VS VanHook at 16, n3.

[redacted]

[redacted]

My analysis shows that the annual maintenance savings achieved through the use of toppers would be no more than $10.95 million, and that the total savings would be no more than $13.59 million. These figures are [redacted]

because the increases in the amount of Joint Line infrastructure and in general price levels that have occurred since 2005 have been [redacted] Mr. VanHook's own description of the way that Joint Line infrastructure improvements have mitigated the need for and operational impacts of slow orders.

Benefits – Other Lines

[redacted]

[redacted] the entire body of evidence in this proceeding uniformly shows that (a) the deposition of fugitive coal declines significantly with distance; (b) coal volumes dissipate as Joint Line traffic moves onto different routes away from the Basin; and, (c) the effectiveness of the low-water toppers under consideration declines with distance. There is no need to perform a formal correction of Mr. VanHook's methodology in this area, because the number of multiples of the corrected Joint Line maintenance and operational savings that would be needed to justify the costs of the toppers would not comport with these realities.

Benefits – Retention of Coal

I concur in principle with the general proposition advanced by BNSF reply witness VanHook[59] and UP reply witness Glass[60] that it is appropriate to take into

[57] See BNSF COALDUST 0019748+.
[58] See BNSF Reply VS VanHook, Exhibit 11.
[59] BNSF Reply VS VanHook at 32-33.
[60] UP Reply VS Glass at 7.

account the value of any increase in the quantity of coal actually delivered to customers by virtue of the improved retention of coal provided by a topping agent (or any other dust control strategy). Depending upon such factors as the quantity of the coal retained and the value of that coal, the retention of coal can be a significant consideration in some circumstances. However, I believe the railroad witnesses have overlooked an important consideration that appears to moot this issue, at least for PRB coal.

The additional consideration that must be taken into account before such a benefit can be ascribed to a topper program is that the weight the treatment material itself adds to the car must be subtracted from any improvement in coal retention to account for the fact that, all else equal, the weight of the treatment reduces (by a very small percentage) the amount of coal that can be loaded into a treated car relative to an untreated one. Using an exaggerated example for illustration, if a car can carry a total net weight of 240,000 pounds without going overweight, an untreated car can be loaded with as close to 240,000 lb. of coal as such circumstances as the accuracy of loading equipment and scales will permit, while a car that is to receive 1000 pounds of topper can only be loaded with as close to 239,000 pounds of coal as such circumstances will permit. Put another way, the amount of coal the shipper receives from each car is determined not only by the ability of the topper to retain coal, but also by the restriction on lading imposed by the weight of the topper itself.

For PRB coal, the weight measurement study cited by UP concluded that coal loss from the tops of untreated cars averages 225 pounds,[61] and that the average coal loss from

[61] See UP Reply VS Beck at 2. BNSF witness VanHook relies on [redacted]

the tops of treated cars is [redacted] pounds.[62] That study further estimated the weight of the added topper (including water and solids) as [redacted] pounds per car.[63] In theory, the mine could load the car with [redacted] pounds of coal, add [redacted] pounds of topper and stay within the assumed 240,000 lb net weight limit. Holding aside any changes in moisture content, such a car would lose [redacted] pounds of coal enroute, and the shipper would receive [redacted] pounds of coal. However, if the mine loaded 240,000 pounds of coal and applied no topper, the shipper would receive 239,775 pounds of coal. In short, the best available evidence indicates that in the case of PRB coal [redacted] would be created by the introduction of a topper spraying program. Therefore, it would not be proper to include any benefit of this type in the cost-benefit analysis.

Even though the retention of coal does not lead to a net benefit, BNSF claims that its maintenance savings from the control of coal dust through the application of toppers would be greater than the costs that would be incurred by shippers to do so. However, it never explains why, if this is correct, BNSF long ago did not ask shippers for permission to apply toppers at its own expense, or implement a simple rate incentive to obtain such permission.

(c) Other Applications of Toppers

BNSF's argues that "(T)he State of Virginia requires that steps be taken to curtail coal dust emissions from moving coal trains."[64] As it did when it first attempted to threaten shippers with draconian penalties for failure to comply with its unilateral coal

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[redacted] and estimated the actual coal loss to be 225 pounds/car.

[62] See BNSF COALDUST 0033110.

[63] Calculated as [redacted] See BNSF COALDUST 0033108.

[64] BNSF Reply Argument at 7.

dust requirements, BNSF once again seems to be overlooking the statutory authority held by this Board over the interstate rail system. If any state sought to impose a requirement on interstate rail operations that did not meet with voluntary cooperation by involved parties, any such party – shipper, railroad or receiver – could ask the Board to determine the reasonableness of the requirement. The same way BNSF has to substantiate the reasonableness of the coal dust requirements it seeks to impose, so too would any other entity seeking to impose any analogous requirements. I am not aware of any effort by Virginia (or, for that matter, Canada, Australia or Columbia) to obtain a Board determination of the reasonableness of any coal dust requirement it has sought to impose on U.S. interstate rail operations. Absent such a determination, BNSF's characterization of a requirement by Virginia "to curtail coal dust emissions" while coal is being moved by railroads is completely illusory.

BNSF's argument properly cites a resolution of the state legislature requesting that railroads make certain reports to the legislature regarding fugitive coal dust from moving trains in Virginia. My understanding is that the situation the Virginia legislature is addressing involves the nuisance aspect of coal dust given off by trains passing through developed areas. NS and one or more mines have voluntarily undertaken (and funded) a program of spraying on specific movements. Importantly, there has been no allegation that the coal dust has any adverse impact on rail ballast, shippers basically are out of the loop on implementing and paying for the spraying, and NS has threatened no dire consequences for shippers if individual trains still issue some dust. Moreover, [redacted]

[redacted] The fact that this is the only domestic example of coal dust control BNSF can offer is indicative of how unprecedented its program would be.

BNSF also claims that "other jurisdictions", including Canada, Australia and Colombia, ". . . have adopted measures to curtail ...coal dust emissions." [65] However, I am unable to locate any portion of the testimony of BNSF's witnesses that substantiates this claim. Mr. VanHook says that coal shippers in Colombia "apply compaction rollers to prevent coal losses,"[66] but provides no substantiation for the proposition that this is a requirement.[67] Mr. VanHook also says that surfactants "are applied in Canada and Australia to curtail coal dust",[68] but he does not cite any legal requirement from either of those "jurisdictions" imposing that measure on coal shippers. He also neglects to mention that the Canadian application also involves [redacted] and is premised on a loss rate of coal more than 10 times as high as the rate that has been measured in the PRB. Mr. Emmitt describes track side monitoring and weather stations in Australia installed for the purpose of "establishing an acceptable standard of particle levels with targeted mitigation response to dusty coal",[69] but never claims that any Australian "jurisdiction" has ever imposed a dust curtailment obligation on coal shippers.

BNSF's citation of Australia is particularly incongruous, because the so-called Connell Hatch report on coal dust for Queensland Rail[70] validates AECC's position and refutes BNSF's positions on a number of critical issues. Specifically, the report indicates that at least 95 percent of coal fouling is from lumps of coal, not from the

[65] BNSF Reply Argument at 7.
[66] BNSF Reply VS VanHook at 2.
[67] See also BNSF Reply VS Emmitt at 7 n. 2.
[68] BNSF Reply VS VanHook at 2-3.
[69] BNSF Reply VS Emmitt at 7-9.
[70] "Coal Loss Literature Review", Coal Loss Management Project (January 11, 2008)

airborne suspension of dust (Section 2.3.2); that because of the comparatively low density of coal, a volumetric measure (and not the weight measure used by BNSF witness Tutumluer) must be used to assess ballast contamination (Section 2.3.4); and that dusting is nonlinearly related to speed (Section 3.1). The report provides no support for BNSF's oft-repeated proposition that coal possesses special properties other than its straightforward volumetric contribution to ballast fouling (as applied in my restatement of Mr. VanHook's analysis of maintenance cost impacts).

In short, BNSF's attempts to draw support from other "jurisdictions" underscore how aberrant BNSF's proposal really is. No coal shippers anywhere are subjected to a threat that all of their shipments will be surcharged, or subjected to denial of service, based solely on the judgment of the railroad regarding the adequacy of the shipper's performance under a measurement system that itself is designed, implemented, interpreted and controlled by the railroad. Perhaps BNSF should ask NASA if it has detected evidence of such programs on other planets, because there is no precedent for it on this one.

(d) Other Issues

Deferred Maintenance -- BNSF argues in Appendix A at pages 8-9 that I have somehow misconstrued a memorandum by William Seeger, then General Director – Maintenance, regarding the changes in the ballast cleaning schedule on the track where the BNSF derailment occurred. BNSF asserts specifically that "no maintenance was deferred", but this assertion apparently is based on a definition of the term "deferred" that only BNSF understands. Indeed, BNSF does not dispute that it knew this line needed to be undercut, and that at one point in time, it was scheduled to be undercut in 2004. While BNSF tries to portray the schedule for "the undercutter" as some type of exogenous consideration,

BNSF is the entity responsible for managing its maintenance equipment and performance. If BNSF elects to keep maintenance tasks waiting for a single piece of equipment rather than put in enough resources to do work when it is needed, I understand that to be a form of deferral. Ironically, having admitted that the line was originally scheduled for undercutting in 2005, BNSF doesn't seem concerned that by its own description, the line was left off the 2005 undercutting schedule after the plan to undercut in 2004 didn't work out. BNSF probably has a different word for it, but to me that's deferral, too.

Ballast Contaminants -- BNSF reply witnesses VanHook and Emmitt engage in a highly misleading exchange regarding the composition of the materials fouling the ballast. Mr. VanHook at page 3 purports to rely on witness Emmitt to provide an answer to "questions that the shippers have previously raised about the extent to which the contamination of ballast is attributable to coal dust or to some other substance." However, the analysis that witness Emmitt describes was based on the material in the dustfall collectors. The dustfall collectors have no way to gather ballast contaminants other than those that travel through the air, but much or most ballast fouling comes from sources like ground ballast particles and upward migration of subgrade materials. It is wholly inaccurate and misleading for Mr. VanHook to state that the analysis performed by witness Emmitt provided any insight regarding the relative proportions of the materials fouling the ballast.

Transcripts Regarding The Derailments -- BNSF's argument (at App. A, page 6) attempts to muddy the water regarding my reading of transcripts and other materials pertaining to the UP derailment. While BNSF asserts that the materials I reviewed were not

"complete", the conclusions I drew from the materials I did review were itemized clearly in my opening VS. They include the following:

- Rough track was reported at the site of the eventual UP derailment;
- BNSF dispatched a crew to perform repairs;
- The crew reported that the repairs had been completed, tested with the passage of helper locomotives and restored to service; and,
- The first train to use the track was the UP train, which derailed in the immediate area of the repair.

If I made some error of interpretation or omission, BNSF had ample opportunity to bring forward documents or a witness to set the record straight. The fact that they did not indicates that they have no substantive issues with the content of my statement.

Rerouting – Page 5 of the reply VS of BNSF witness Smith presents a rerouting analysis that purports to show inefficiencies associated with coal-related maintenance needs. However, even a cursory examination suggests that the entire analysis is patently false and misleading.

The crux of witness Smith's assertion is that maintenance needs on BNSF's Sand Hills line across Nebraska cause BNSF to incur large amounts of circuity on BNSF's volume movement from the PRB to/through the Memphis gateway. Witness Smith specifically asserts that BNSF must make use of a route through Amarillo, TX that undoubtedly would be quite circuitous. The problem is that witness Smith does not mention the fact that BNSF has available not just one, but two routes that more closely parallel the subject route across Nebraska, and would entail much less circuity than would the route via Amarillo. First, BNSF has its own CTC-controlled mainline route from Denver to Lincoln that is shown by BNSF's weight restriction map (http://www.bnsf.com/customers/pdf/mapa.pdf) to be suitable for use by cars up to 315k. Second, BNSF has available its friendly connection with NKCR, which could provide

bridge service between the BNSF-served points of Sterling, CO and Holdrege, NE.[71] Use of either route would permit BNSF to bypass the problem area Mr. Smith describes. However, Mr. Smith does not even acknowledge the existence of these routes, let alone provide a plausible reason why they could not be used to handle either the entire diverted movement or a directional operation in which the empty movements are diverted to the alternate route.[72]

Loaded vs. Empty – On pages 7 and 14, witness Emmitt makes comparisons between the observed dusting levels of loaded vs. empty cars. I view these analyses as being ill-founded and unreliable, since the [redacted]

Disclosure of computer code – On page 21 of his Reply VS, witness Emmitt's attempt to defend the nondisclosure of the computer code used to process the TSM signals into

[71] NKCR interchanges with BNSF for PRB unit coal train movements to the large NPPD Gentleman powerplant near Sutherland, NE and also handles unit grain trains for elevators on the eastern end of its line. See http://www.omnitrax.com/rail_nkcr.aspx# . It is not credible that Mr. Smith ignored this route without explanation.

[72] UP is understood to have planned an analogous dispatching pattern for returning PRB empties using its "KP" route across Kansas to Denver.

IDV.2 values is invalid on its face. Witness Emmitt postulates that interested parties could replicate the code by being informed of its logic, but he overlooks the obvious possibilities that the code will (a) contain errors in implementing the stated logic; and/or (b) implement logic that has not been disclosed. This is not a situation where a standardized commercial product is used to perform routine tasks, such as assigning rail mileages, calculating statistics or even estimating econometric models. In such situations, all parties have an equal opportunity to acquire the software and benchmark its performance. Here, there is no such opportunity. Witness Emmitt is telling the Board that it is acceptable for a railroad to surcharge a customer, or even suspend its obligation to serve a customer, on the basis of the output of a computer program that never sees the light of day, and that is composed and implemented by a consultant to the railroad.

As a participant in various federal regulatory proceedings, including several railroad mergers and postal rate cases, I find witness Emmitt's views on this to be particularly troubling. In my experience, disclosure of the computer programming used to generate results is integral to testing and ensuring the validity and stability of the results. Seemingly innocuous code may implement undisclosed processing of outliers, read values from incorrect fields, etc. With disclosure there is no guarantee than all such errors will be found, but without disclosure there is no assurance that any of them will be found.

Revenue Adequacy – UP reply witness Glass offers various assertions regarding UP's lack of revenue adequacy and its associated need to ensure extraordinary maintenance costs are covered. While the Board obviously has a mandate to consider revenue adequacy issues, it has an even more powerful mandate to avoid cross-subsidy. For example, in a rate case, the SAC constraint limits differential pricing even when the

carrier is not revenue adequate. There is no standard under which a traffic group can be compelled to cover more than all of its costs plus a market rate of return.

As UP first found in the WPL/Edgewater case, and later reaffirmed in the KCPL/Montrose and OGE/Muskogee cases, PRB coal, as a whole, pays its own way so well that the SAC costs in rate cases frequently fall below the jurisdictional threshold. Put another way, PRB coal would pay all of its costs, including a market rate of return, at rates below the rates currently charged. While Mr. Glass's interest in UP's bottom line is understandable, the Board should not rely on this criterion to permit the railroads to inefficiently dump costs on PRB coal shippers, who, as a group, already are paying their own way.

Other commodities – Witness Glass also discusses the hypothesized effects of coal on other commodity movements as coal is commingled with other commodities on lines away from the Joint Line. While witness Glass portrays coal as being detrimental to other commodity movements, the data put into the record by UP tell a different story. Basically, UP's dustfall data [redacted]

[73] See UP-AECCBN-0013581 to -0013583.

6. Synthesis

BNSF asserts that coal dust is a major issue that warrants the imposition on shippers of costly requirements. However, the evidence shows BNSF has not taken prudent steps to address demonstrated causes of fugitive coal deposition that are well within its control while it is in possession of the shippers' coal. The data show that fugitive coal is accumulating primarily where rough track shakes it out of cars, where nonlinear aerodynamic pressures from ill-advised high operating speeds blow it out of cars, and where slack action spills it out of cars.

BNSF also has not taken prudent steps to handle fugitive coal and other ballast contaminants. Its own witness cites a concern with blocking drainage at the toe of the ballast, but that's where BNSF initially elected to dump and leave its undercutter waste. Even now, rather than remove the waste, BNSF elects to grade it into adjacent access roads. This raises the level of the access road relative to the toe of the ballast (thus impeding drainage) and leaves the ballast contaminants in close proximity to the ballast.

While none of these management decisions appear prudent, the larger picture that emerges is one of decision-making on the basis of short-term considerations while improperly discounting longer-term considerations. Running trains fast down hills may save a small amount of crew time on each movement, but over time it puts extraordinary wear on the infrastructure and generates lots of fugitive coal. Skimping on frog maintenance or ballast tamping may save money this quarter, but also generates longer-term wear and fugitive coal issues. BNSF's trackside disposal of undercutter waste achieves immediate savings while generating longer-term issues. Even the apparent short-cuts taken in construction of more recent segments is suggestive of prioritizing construction cost savings over the longer-term performance of the asset.

In this light, the BNSF coal dust requirements look like an attempt to force shippers to bear the costs associated with relieving BNSF of at least a portion of the longer-tem issues that it historically has tried to ignore. Indeed, BNSF has acknowledged that its acquisition by Berkshire Hathaway will let it focus better on the long term without myopic pressure for quarterly results that arose in the Wall Street environment:

"GHARIB: Now that Burlington is part of Berkshire Hathaway, do you feel that you have more freedom to invest and expand?

ROSE: We're in about month three now. And this month we're here today is typically our annual meeting month. It's typically our quarterly release month. Two things that I'm not doing. So it is a little different. And when we think about how that will translate into how we run this company again, I think all that will be very positive that we will be focused over a little bit longer term horizon than perhaps what is going on in a given quarter.

GHARIB: So do you have a wish list of projects that you just couldn't do as a public company but now seem possible.

ROSE: There is no doubt that Warren has been very clear he wants to us reinvest in the railroad. And if you think about, if you are a public company, in terms of generating free cash flow, you really have three different alternatives. Buy back your stock. Dividend out to your shareholders or reinvest in your company either your own company or through a strategic acquisition. We no longer can buy back our own stock because we don't have any so we're down to dividending (ph) up to Berkshire as the parent or reinvesting in our company. And I think Warren's made it clear that he wants to see us reinvest back in the railroad." [74]

In this light, the coal dust requirements are unreasonable not only because they cost more than they save, but also because they facilitate a myopic management view that even BNSF's new ownership does not wish to encourage.

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[74] See http://www.pbs.org/nbr/site/onair/gharib/burlington_nothern_ceo_matthew_rose_100429/ .

On page 3 of its argument, BNSF urges the Board to find its coal dust provisions reasonable on the basis that, if the Board doesn't allow them to take effect, "no shipper is likely to adopt curtailment measures". This assertion is unsupported and is inconsistent with the entire history of PRB coal transportation under the Staggers Act. Over the past 30 years, shippers have voluntarily cooperated with railroads by investing billions of dollars in such productivity enhancements as aluminum railcar fleets and expanded unloading facilities that support longer train lengths, all in furtherance of the objective of minimizing the resource costs associated with PRB coal movements. BNSF is not getting cooperation from shippers on its coal dust requirements not because shippers need to face a Board order to cooperate, but because BNSF's coal dust initiative does not minimize the resource costs associated with PRB coal movements. Indeed, shippers and mines have generally cooperated with railroads in the implementation of the profiling requirement, and I understand that many shippers are voluntarily using less-dusty 3" coal. Potential initiatives to address fugitive coal that would be consistent with available evidence and sound management are presented in Exhibit 2.

Also on page 3, BNSF attempts to raise the specter of increasing risks to the stability of the rail network. However, as clearly stated in DOT's reply comments:

> [M]aintenance of way is a basic railroad responsibility. As noted previously, the specifics required for proper maintenance may vary according to physical environment, traffic volume, or other factors, but the underlying obligation to provide transportation upon reasonable request is a constant. 49 U.S.C. § 11101. Coal traffic in the PRB is sufficiently voluminous that it likely not only demands very robust rail infrastructure but also entails substantial "wear and tear" thereon. ^ BNSF and UP would have to accept this as a matter of course in their maintenance programs even if no coal dust ever escaped from rail cars.

DOT Reply at 5-6. Thus, there is no risk at any volume level of the Joint Line (or any other operating rail infrastructure) becoming "unstable" without the railroad being held responsible. BNSF has obligations to provide prudent management and to maintain its infrastructure to meet defined standards. As a matter of sound public policy, BNSF must not be permitted to hold shippers or the Board hostage through threats to withhold performance it is statutorily obliged to supply.

Exhibit 1

ADDITIONAL EXAMPLES OF BNSF'S INCONSISTENT ARGUMENTS

- BNSF relies on visible accumulations of coal dust on the surface of the Joint Line right-of-way to infer that coal dust played a major role in the May 2005 Joint Line derailments, but then asserts that it has no way to tell whether coal dust is fouling ballast at any particular point whether or not coal dust can be seen on the surface.

- The fact that BNSF is providing speculative assertions rather than actual data regarding the composition of the materials fouling the ballast at the time and place of the derailments indicates either that it was not interested in knowing the facts surrounding the derailments, or that it knows the facts and has elected not to rely on them. Neither scenario is supportive of the need for or reasonableness of the Tariff.

- Having proclaimed the dangers posed to rail ballast by coal dust, and the ability of passing trains to stir coal dust already on the ground, BNSF nevertheless spreads undercutter waste into the surface of the access roads immediately adjacent to its tracks, rather than remove the waste or provide for it to become covered by vegetation.[1]

- BNSF resists the idea that its program is not cost effective, but then asserts that the contamination it is trying to get rid of comes from only 14 percent of the trains. That means 86 percent of the trains would be treated without needing to be.

- BNSF asserts that its monitoring system provides a reasonable linkage between airborne dust and fugitive coal deposition, but then declines to use the particle filter in the e-sampler to establish an actual relationship between the signal received and the mass of the material in the sampler.

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[1] BNSF Reply VS Sloggett at 7.

Exhibit 2

POTENTIAL FUGITIVE COAL AND MAINTENANCE INITIATIVES

1. Better maintenance of frog and other switch components, and rough track.
2. Better maintenance pertaining to modulus changes, including tamping frequency.
3. Review MAS for loaded trains in light of studies and fugitive coal issues; consider lower MAS for loaded coal trains.
4. Trainhandling monitoring with impact detectors and training to better manage slack action.
5. Improved crosswind protection on fills.
6. Items listed by UP.
7. Monitor use, deposition of locomotive sand.
8. Conduct further analysis to identify actionable aspects of fugitive coal deposition patterns.

Exhibit 3

PARTIAL SUMMARY OF PHOTOGRAPHIC EVIDENCE OF JOINT LINE -

MAINTENANCE IRREGULARITIES

UP-AECCBN-0003548
UP-AECCBN-0003549
UP-AECCBN-0003732
UP-AECCBN-0003733
UP-AECCBN-0003734
UP-AECCBN-0003735
UP-AECCBN-0004020
UP-AECCBN-0004021
UP-AECCBN-0004022

<< UP-AECCBN-0003548 >>
WIMMER'S PHOTOS
BNSF ORIN S(JBbIVISION
PHOTO NO. MILEPOST ANb bESCRIPTIOI'J bATE TAKEN
868 MR 94.85 - ML #2 5/17/2005
869 MR 92.30 - ML #1 - Void Under Ties 2 1/2" 5/17/2005
870 MR 92.30 - ML #1 T/R bef I. 1" 5/17/2005
871 MP 92.30 - ML #1 5/17/2005
872 MR 92.1 - ML #1 5/17/2005
873 MP 91.72 - ML #1 On Bridge & Approach 5/17/2005
674 MP 97.72 - ML #2 On Bridge & Approach 5/17/2005
875 MP 97.72 - ML #1 On Bridge 5/17/2005
876 MP 75.4 - ML #1 Panel Removed at POD 5/17/ 2005
* 877 MP 75.4 - ShowIng Broken Ties 5/17/2005
878 MP 75.4 - British Rail - 1999 5/17/2005
879 MR 75.4 - Mark Where Wheel Dropped In 5/17/2005
880 MP 75.4 - Dirt Removed From Ballast Section 5/17/2005
861 MP 75.4 - AT POD 5/17/2005
882 MP 75.20 - Mud Tamped on Bridge ML #1 5/17/2005
883 BR 75.2 - ML #2 - ShowIng Surface - Looking North 5/17/2005
884 MR 75.3 - Mud In Transition - Wood In Concrete - ML #2 5/17/2005
885 BR 75.2 - ML #2 - Broken Ties/Mud on Bridge 5/17/2005
886 BR 75.2 - ML #2 - Broken Ties/Mud on Bridge 5/17/2005
887 BR 75.2 ML #2 - Surface - Looking South 5/17/2005
888 MP 74.7 - Mud Tamped on CrossIng Approach 5/17/2005
889 MR 74.7 - Panel Removed From ML #1 - 8 Broken Ties 5/17/2005
890 MP 74.7 - Found by Gene Reilly - Replaced by BNSF 5/17/2005
891 MP 74.7 5/17/2005
892 MP 63.2 - FRA Said Cause of UP Derailment 5/17/2005
893 MP 63.2 - Was A Broken Rail - Not True 5/17/2005
894 MP 63.2 - Broken Rails 5/17/2005
895 MP 63.2 - Broken Rails 5/17/2005
896 MP 63.2 - Broken Rails 5/17/2005
897 MP 63.2 - Broken Rails 5/17/2005
898 MP 63.2 - View of UP Derailment on 5/15 5/17/2005
899 MP 63.2 - View of UP Derailment Water Hole 5/17/2005
900 MP 62.7 - ML#1 Mud - Looking South 5/17/2005
901 MP 62.6 - Mud In SW Loc ML #3 5/17/2005
902 MP 62.7 - ML #3 - Mud In Transition Ties 5/17/2005
903 MR 62.7 - ML #2 - Mud - Looking North 5/17/2005
904 MR 62.7 - ML #1 - Mud - Looking South 5/17/2005
905 MR 62.5 - ML #2 - Mud - Looking North 5/17/2005
906 MR 62.5 - ML #2 - Mud In Frog Area 5/17/2005
934 MP 52.6 - ML#2 - Mud In Frog Area 5/17/2005
935 MP 52.5 - ML #2 - Mud In Frog Area 5/17/2005
REV. 5/20/2005 @ 11:26 AM PAGE 1 of 2
UP-AECCBN-0003548
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<< UP-AECCBN-0003549 >>
WIMMER'S PHOTOS
BNSF ORIN SLJBbIVISION
PHOTO NO. MILEPOST AND DESCRIPTION DATE TAKEN
936 MR 52.5 - ML #1 - Broken Frog - 25 MPH 5/17/2005
937 MR 52.5 - ML #1 - Frog Point Down 1/2 to 3/4" 5/17/2005
938 MP 525 - ML #1 - Frog Point Down 1/2 to 3/43t 5/17/2005
939 MP 52.5 ML #1 - Frog Paint Down 1/2 to 3/4" 5/17/2005
940 MP 52.5 - MP #1 - Mud In SW Area 5/17/2005
941 MR 52.5 - ML #1 - Mud In Transition 5/17/2005
942 MR 42.9 - ML #1 - Mud In SW Area 5/17/2005
943 MP 42.9 - ML #1 - Mud In SW Area 5/17/2005
944 MR 265 - ML #2 - Mud In Insulated Joints 5/17/2005
945 MR 51.7 - Set-Out - Derail In Wrong Position 5/16/2005
946 MR 51.7 - Set-Out Coal Car On 1% Grade to So. 5/18/2005

947 MP 52.5 - ML #1 - Bond-Aid Weld On Frog 5/18/2005
948 MP 52.5 - ML #1 - Band-Aid Weld on Frog 5/18/2005
949 MP 62.3 - ML #1 Broken Ties 5/16/2005
950 MP 62.35 - Mud On Mine Lead 5/18/2005
951 MR 63.5 - ML #1 - Track Surface 5/18/2005
! 952 MR 63.5 - ML #1 - At Derailment Site - 10 MPH 5/18/2005
953 MR 65.5 - ML #1 - Train Using Crossover 2 To 1 5/18/2005
954 MR 75.2-ML #2 5/18/2005
955 MR 75.2 - ML #2 5/18/2005
956 MR 75.2 - ML #2 5/18/2005
957 MR 75.3 - ML #1 5/18/2005
Blow Up of 956 -- ML #2 Showing 5 Concrete Ties Broken 5/18/2005
and 4 Wood Ties Missing Pandral Clips
958 MR 112.4 - ML #2 - Tight Gage 55 5/8" 5/18/2005
959 MR 112.4 - ML #2 - Tamper Working Mud 5/18/2005
960 MR 112.4 - ML #2 - Ballast bumped On Mud 5/18/2005
961 MR 112.4 - ML #2 - Broken Ties - 8-13 l!ow 5/18/2005
962 MR 112.4 - ML #2 - Mud Full Depth of Ballast 5/18/2005
963 MR 112.4 - ML #2 - Holland Star Measuring Car 5/18/2005
964 MR 112.4 - ML#2 - Location of Tight Gage 5/18/2005
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BNSF PHOTOS BY BILL WIMMER
BNSF PHOTOS #3
PHOTO #!MP LOCATION bESCRIPTION bATE OF PHOTO
ORIN_SUBbIVISION
1123 Gillette, WY Command Center Slow Order Board 6/13/2005
1124 Gillette, WY Managers in Command Center 6/13/2005
1125 MP 14.48 Water and Mud in Turnout (#2 ML) 6/14/2005
1126 MP 14.97 Broken Frog (#2 ML) 6/14/2005
1127 MP 15.05 Bad Frog Point (#1 ML) 6/14/2005
1128 MP 15.01 Comp. Bar on Heel Frog 136/132 6/14/2005
1129 MP 15.01 Rail and Frog 136/136 6/14/2005
1130 MP 15.80 Spring Rail Frog - Bad Point (#2 ML) 6/14/2005
1131 MP 15.80 Spring Rail Frog - Bad Point (#2 ML) 6/14/2005
1132 MP 16.36 Spring Rail Frog - Showing Chip 6/14/2005
1133 MP 16.28 RBM Frog Needs Welding (E. Belle Ayr) 6/14/2005
1134 MP 16.28 Muddy Turnout Condition (E. Belle Ayr) 6/14/2005
1135 MP 16.36 Muddy Turnout Condition (#2 ML) 6/14/2005
1136 MP 16.36 Frog Point Needs Welding (#2 ML) 6/14/2005
1137 BR 16.60 Mud on Bridge (#2 ML) 6/14/2005
1138 BR 16.60 Mud on Bridge (#2 ML) 6/14/2005
1139 MP 17.22 Muddy Turnout (#2 ML) Frog Bent 6/14/2005
1140 MP 17.22 Muddy Turnout (#2 ML) 6/14/2005
1141 MP 17.22 Muddy Turnout (#2 ML) 6/14/2005
1142 MP 17.22 Muddy Turnout (#2 ML) 6/14/2005
1143 MP 17.23 Muddy Turnout (#2 ML) 6/14/2005
1144 MP 17.23 Muddy Turnout (#2 ML) 6/14/2005
1145 MP 17.23 Frog Point Bad - Needs Welding 6/14/2005
1146 MP 17.78 Frog Point Needs Welding 6/14/2005
1147 MP 17.78 Frog Point Needs Welding 6/14/2005
1148 MP 17.80 Frog Needs Welding 6/14/2005
1149 MP 17.91 Frog Area Very Muddy 6/14/2005
1150 MP 17.91 Frog Point Needs Welding 6/14/2005
1151 MP 20.98 Wet and Muddy Turnout (#1 ML) 6/14/2005
1152 MP 21.06 Frog Needs Welding Repd TO CC @ 9:20 AM) 6/14/2005
1153 MP 21.06 Frog Insert Broken (#2 ML) 6/14/2005
1154 MP 21.07 Mud in Turnout Area (#2 ML) 6/14/2005
1155 MP 21.10 Overview of CP @ W. Cordero Jct. 6/14/2005
1156 MP 21.10 Overview of Cordero Mine 6/14/2005
1157 BR 21.60 Mud on Bridge (#1 ML) 6/14/2005
1158 BR 21.60 Mud on Bridge (#2 ML) 6/14/2005
1159 MP 23.65 Frog Belt Missing (#2 ML) 6/14/2005
1160 MP 23.67 Running Rail on Frog Bad (#2 ML) 6/14/2005
1161 MP 23.67 3 Frog Bolts Missing (#2 ML) 6/14/2005
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BNSF PHOTOS BY BILL WIMMER
PHOTO #IMP LOCATION bESCRIPTION bATE OF PHOTO
1162 MP 23.78 Frog Needs Welding (#1 ML) 6/14/2005
1163 MP 24.62 Wet and Muddy Turnout (#2 ML) 6/14/2005
1164 MP 24.62 Wet and Muddy Turnout (#2 ML) 6/14/2005
1165 MP 24.62 Wet and Muddy Turnout (#2 ML) 6/14/2005
1166 MP 24.62 Wet and Muddy Turnout (#2 ML) 6/14/2005
1167 MP 24.54 Wet and Muddy in Insulated Joint Area (#2 ML) 6/14/2005
1168 MP 24.55 Wet and Muddy in Insulated Joint Area (#2 ML) 6/14/2005
1169 MP 24.56 Wet and Muddy in Insulated Joint Area (#2 ML) 6/14/2005
1170 MP 25.85 Mud in Frog Area (#2 ML) 6/14/2005
1171 MP 25.85 Mud in Frog Area (#2 ML) 6/14/2005
1172 MP 25.85 Frog Needs Welding (#2 ML) 6/14/2005

1173 MP 25.93 Frog Point Showing Wear (#1 ML) 6/14/2005
1174 MP 25.94 Mud in Frog Area (#1 ML) 6/14/2005
1175 MP 25.94 Muddy Turnout (#1 ML) 6/14/2005
1176 MP 26.50 Frog Point Wear (#1 ML) 6/14/2005
1177 MP 26.50 Frog Point Needs Welding (#1 ML) 6/14/2005
1178 MP 26.52 Mud in Turnout Area (#1 ML) 6/14/2005
1179 MP 26.60 Frog Point Needs Welding (#1 ML) 6/14/2005
1180 MP 26.55 Comp. Joint 136/132 in 136# Rail (#1 ML) 6/14/2005
1181 MP 26.56 Joint Close to Ins. Jt. (37" and 61") (X-O) 6/14/2005
1182 MP 28.38 Bolt Missing in Insulated Joint (#1 ML - NR) 6/14/2005
1183 MP 30.02 Bolt Missing in Insulated Joint (#1 ML - NR) 6/14/2005
1184 MP 31.78 Looking South at Coal bust Accu'l. (#1 ML) 6/14/2005
1185 MP 31.78 Frog Point Wear - Spring Frog (#2 ML) 6/14/2005
1186 MP 32.10 Muddy #11 Turnout (#1 ML) 6/14/2005
1187 MP 32.10 Muddy #11 Turnout (#1 ML) 6/14/2005
1188 MP 33.00 Rough Surface Account Mud (#2 ML) 6/14/2005
1189 MP 34.06 Muddy Turnout (#1 ML) 6/14/2005
1190 MP 42.12 Frog Needs Welding (#2 ML) 6/14/2005
1191 MP 42.19 Frog Needs Welding (#1 ML) 6/14/2005
RENO_SUBbIVISION
1192 MP 2.56 Frog Needs Welding - Bolt Missing (#2 ML) 6/14/2005
1193 MP 2.56 Frog Needs Welding (#2 ML) 6/14/2005
1194 MP 2.53 Bad Frog - Replace (#2 ML) 6/14/2005
1195 MP 2.53 Heel Frog - Bad (#2 ML) 6/14/2005
1196 MP 2.53 Mud in Turnout (#2 ML) 6/14/2005
1197 MP 2.45 Muddy Track (X-Over) 6/14/2005
1198 MP 2.45 Muddy Track (X-Over) 6/14/2005
1199 MP 2.42 Muddy Turnout (#1 ML) 6/14/2005
1200 MP 0.70 Frog Needs Welding (#1 ML) 6/14/2005
1201 MP 0.70 Mud Under Frog (#1 ML) 6/14/2005
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BNSF PHOTOS BY BILL WIMMER
PHOTO #IMP LOCATION DESCRIPTION DATE OF PHOTO
ORIN_SUBDIVISION
1202 MP 42.94 Mud Under Frog (#1 ML) 6/14/2005
1203 MP 42.94 Muddy Turnout - E. V/ye Reno Sub (#1 ML) 6/14/2005
1204 MP 43.39 Mud Under Swing Nose Frog (#1 ML) 6/14/2005
1205 MP 43.47 Ties Burned Out (#2 ML) 6/14/2005
1206 MP 51.87 Spring Frog Removed From ML (#2 ML) 6/14/2005
1207 MP 52.47 Chip in Frog Point (#1 ML) 6/14/2005
1208 MP 52.64 Mud in Frog Area (#1 ML) 6/14/2005
1209 MP 52.64 Frog Needs Welding (#1 ML) 6/14/2005
1210 MP 52.60 Mud in Transition (#2 ML) 6/14/2005
1211 MI' 58.10 Bad Surface on ML 6/14/2005
1212 MP 58.10 Coal Train Thru T.O. 6/14/2005
1213 MP 58.09 Mud in Frog Area (#2 ML) 6/14/2005
1214 MP 58.09 Bad Frog Point (#2 ML) 6/14/2005
1215 MP 59.00 Looking North at Coal Dust 6/14/2005
1216 MP 52.38 Mud in T.O. Area (#1 ML) 6/14/2005
1217 MP 62.38 Bad Frog Point (#1 ML) 6/14/2005
1218 MP 62.20 E. Wye @ Nacco - Wide Gauge in Xing (md. #2) 6/14/2005
1219 MP 62.20 E. Wye @ Nacco - Wide Gauge in Xing (End. #2) 6/14/2005
1220 MP 61.85 Six Broken Concrete Ties (#1 ML) 6/14/2005
1221 MP 61.85 Muddy Transition (#1 ML) 6/14/2005
1222 MI' 61.73 Mud in Frog Area (#1 ML) 6/14/2005
1223 MP 62.27 Bad Track Surface (#1 ML) 6/14/2005

1224 MP 62.47 Mud in Frog Area (#2 ML) 6/14/2005
1225 MI' 63.16 T.O. Removed After Derailment (#1 ML) 6/14/2005
1226 MP 63.16 Mud in Switch Area (#3 ML) 6/14/2005
1227 MP 63.16 Looking South @ Mud (#3 ML) 6/14/2005
1228 MP 65.29 Frog Bolt Out of Swing Nose (#2 ML) 6/14/2005
1229 MP 67.30 Rod X-Level in Curve (#1 ML) 6/14/2005
1230 MI' 72.00 Shy Ballast in CP Location (#1 ML) 6/14/2005
1231 MP 72.24 Mud in T.O. Area (#3 ML) 6/14/2005
1232 MP 72.25 24' Break in Swing Nose Frog (ML #3) 6/14/2005
1233 MI' 72.5 Comp. Jts. - Heel 136# Frog to 136# Roil 6/14/2005
141/136 and 136/132
1234 MI' 74.6 Sq. Jt. Of Track Panel Pumping Mud (#1 ML) 6/14/2005
1235 MI' 74.6 Sq. Jt. Of Track Panel Pumping Mud (#1 ML) 6/14/2005
1236 MI' 74.6 Sq. Jt. Of Track Panel Pumping Mud (#1 ML) 6/14/2005
1237 MP 74.6 Mud Beyond Panel Laid (#1 ML) 6/14/2005
1238 MI' 74.6 Note Joint Swinging 6/14/2005
1239 MI' 76.20 tO. Removed After Derailment (#1 ML) 6/14/2005
1240 MI' 119.32 New Swing Nose Installed After 2005 6/15/2005
1241 MI' 123.62 Fisher Jct. - Frog Remo'd to UP 6/15/2005
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BNSF PHOTOS BY BILL WIMMER
PHOTO #IMP LOCATION bESCRIPTION bATE OF PHOTO
1242 MP 123.10 Bad Frog Point - End 2nd ML 6/15/2005
1243 MP 123.10 Bad Fro9 Point - End 2nd ML 6/15/2005
1244 MP 103.63 Bad Frog Point (#3 ML) 6/15/2005
1245 MP 102.70 2 Cars - 80' Concrete Tie Panels 6/15/2005
1246 BR 100.37 Muddy Track on Bridge (#2 ML) 6/15/2005
1247 BR 100.37 Muddy Track on Bridge (#1 ML) 6/15/2005
1248 BR 96.23 Mud on Bridge Approach (#1 ML) 6/15/2005
1249 BR 96.23 Mud on Bridge (#1 ML) 6/15/2005
1250 BR 96.23 Mud on Bridge Approach (#2 ML) 6/15/2005
1251 BR 96.23 Mud Oozing After Surfacing (#1 ML) 6/15/2005
1252 MP 95.75 Cracked RBM Frog (#3 ML) 6/15/2005
1253 MP 95.75 Cracked RBM Frog (#3 ML) 6/15/2005
1254 MP 95.68 Bad Frog Point (#2 ML) 6/15/2005
1255 MP 95.65 Muddy T.O. Area (#2 ML) 6/15/2005
1256 MP 95.28 Crushed Frog Point (#3 ML) 6/15/2005
1257 MP 91.15 Gop in Spring Frog (#1 ML) 6/15/2005
1258 MP 90.5 Coal bust of Train 6/15/2005
1259 MP 90.50 Bad Frog Point Needs Welding (#3 ML) 6/15/2005
1260 MP 90.43 Crushed Frog Point (#2 ML) 6/15/2005
1261 MP 90.50 Mud in CP Location (#2 ML) 6/15/2005
1262 MP 90.14 Crushed Frog Point (#2 ML) 6/15/2005
1263 MP 90.03 Chip in Running Rail (#3 ML) 6/15/2005
1264 MP 85.50 East Bill -- Shy Ballast (#3 ML) 6/15/2005
1265 MP 85.62 Bad Spring Rail Frog (#2 ML) 6/15/2005
1266 MP 85.62 Bad Spring Rail Frog (#2 ML) 6/15/2005
1267 MP 62.38 Frog Welded (#1 ML) 6/15/2005
1268 MP 62.38 Frog Welded (#1 ML) 6/15/2005
1269 MP 62.20 E. Wye - Noaco (@3 md.) X-Level Not Fixed 6/15/2005
1270 MP 24.50 Orin Sub - Track Inspector 6/15/2005
1271 MP 21.06 Frog Still Not Repaired @ 18.30 PM 6/15/2005
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BNSF PHOTOS - BILL WIMMER
BNSF PHOTOS #4
PHOTO #IMP LOCATION bESCRIPTION bATE OF PHOTO SLOW ORbER
ORIN SUBbIVISION
1274 85.73 M.L. #2 - Broken Pt. RBM 7/20/2005 85.6 - 85.8 - 25 MPH
1275 85.73 M.L. #2 - Looking South @ Frog 7/20/2005 85.6 - 85.8 - 25 MPH
1276 85.72 M.L. #2 - Mud Between Turnouts 7/20/2005 85.6 - 85.8 - 25 MPH
1277 85.59 M.L. #2 - New RBM to Replace Spring Rail 7/20/2005 85.6 - 85.8 - 25 MPH
1278 85.60 M.L. #1 - Mud on Bridge 7/20/2005 No Order
1279 90.13 M.L. #2 - Crushed Frog Point 7/20/2005 90.0 - 92.4 - 25 MPH
1280 90.13 M.L. #2 - Bad Frog Point - 7/20/2005 90.0 - 92.4 - 25 MPH
1281 90.42 M.L. #2 - Crush Frog Point 7/20/2005 90.0 - 92.4 - 25 MPH
1282 91.50 M.L. #1 - Shy Ballast on Shoulder 7/20/2005 No Order
1283 91.72 M.L. #1 - Track Tamped - Mud Still in 7/20/2005 No Order
Track - Installing 10" brains on Bridge 7/20/2005
1284 92.25 M.L. #2 - Shy Ballast in Cribs
1285 92.20 M.L. #2 - Mud of Crossing (Code 1 Viol) 7/20/2005
1286 94.50 M.L. #2 - Wood Tie Panels Laid in Concrete 7/20/2005
1287 94.50 M.L. #2 - Six (6) Concrete Panels Removed 7/20/2005
1288 94.50 M.L. #2 - Center Broke Concrete Ties 7/20/2005
1289 95.28 M.L. #3 - Chipped Frog Point on Running Rail 7/20/2005
1290 95.70 M.L. #2 - Shy Ballast in Turnout 7/20/2005
1291 95.68 M.L. #2 - Broken RBM Frog - Welded 7/20/2005
1292 95.76 M.L. #3 - Broken RBM Frog - Welded 7/20/2005
1293 95.70 M.L. #1 - Shy Ballast - CWR Shoulder 7/20/2005
1294 96.30 M.L. #1 - Shy Ballast - CWR Shoulder 7/20/2005
1295 96.20 M.L. #1 - Mud on Bridge beck 7/20/2005
1296 103.10 M.L. #1 - Shy Ballast - CWR Shoulder 7/20/2005
1297 103.63 M.L. #3 - Broken RBM Fro9 - 2 Places 7/20/2005
1298 103.63 M.L. #3 - Shy Ballast - T.O. Area 7/20/2005
1299 103.65 OPP #1 - Swing Nose Frog Panel 7/20/2005
1300 117.70 UP #1 - UP Crossover to be Removed 7/20/2005
1301 117.80 UP #1 - UP Crossover to be Removed 7/20/2005
1302 112.40 M.L. #2 - BNSF Shy Ballast - New Ties 7/20/2005
1303 112.40 M.L. #2 - New Ties @ Tight Gage Loc. 7/20/2005
1304 38.60 M.L. #1 - Looking South @ P811 Project 7/20/2005
1305 38.60 M.L. #1 - Looking North @ New Rail 38 to 38.6 7/20/2005
1306 38.60 M.L. #1 - Looking # 136 CWR Curve - 2005 Rail 7/20/2005
1307 72.50 M.L. #3 - Shy Ballast 7/21/2005
1308 62.38 M.L. #1 - Broken RBM Frog 7/21/2005
1309 62.38 M.L. #1 - Broken RBM Frog 7/21/2005
1310 57.70 M.L. #2 - Slewed Ties Moved Gage 56 1/8 7/21/2005
1311 57.70 M.L. #2 - Rail Anchor Added to Concrete Ties 7/21/2005
1312 52.50 M.L. #2 - Looking North # CP - Renew Ballast 7/21/2005
1313 52.50 M.L. #2 - Looking North # CP - Renew Ballast 7/21/2005
1314 52.50 M.L. #1 - Material Removed from Turnouts 7/21/2005
1315 52.60 M.L. #2 - Ctr Cracked Jt Bar - S.Rail (Inside Bar) 7/21/2005 10 MPH
Placed
1316 52.63 M.L. #1 - Frog With Chip 7/21/2005
1317 52.57 M.L. #2 - Frog with Broken Point (6" to 32' 7/21/2005 10 MPH Placed
Behind_Point)
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BNSF PHOTOS - BILL WIMMER
BNSF PHOTOS #4
PHOTO #IMP LOCATION DESCRIPTION DATE OF PHOTO SLOW ORDER
! OPIN SUBDIVISION -
1318 52.57 M.L. #2 - Frog with Broken Point (6" to 321 7/21/2b05 10 MPH Placed
Behind_Point)
1319 52.47 M.L. #1 - Frog Crushing Behind Frog Pt. 7/21/2005

1320 52.48 M.L. #1 - Material Removed from Turnouts 7/21/2005
1321 52.50 M.L. #1 - Looking South @ Turnotus 7/21/2005
1322 47.47 M.L. #1-Looking North 7/21/2005
1323 47.40 M.L. #2 - Transition Ties 7/21/2005
1324 47.39 ML. #2 - Frog - Bolt Missing 7/21/2005
1325 47.31 ML. #1-Frog Needs Welding 7/21/2005
1326 47.30 ML. #1-Damaged Clips 7/21/2005
1327 47.29 M.L. #2 - Compromised Joint Wrong 7/21/2005
1328 47.29 ML. #2 - Ctr Cracked Jt. Bar S. Rail (N. Bar) 7/21/2005 10 MPH Placed
1329 42.95 M.L. #1 - Men Installing Wood Ties 7/21/2005
1330 42.19 M.L. #1 - New #20 for #1 ML X-Over 7/21/2005
1331 42.19 ML. #1 - New #20 RRM Frog 7/21/2005
1332 42.19 ML. #1 - Existing #20 RBM Frog 7/21/2005
1333 42.12 ML. #2 - Frog Pt. Chipped Out - Bad 7/21/2005 10 MPH Placed
1334 42.12 ML. #2 - Frog Pt. Chipped Out - Bad 7/21/2005 10 MPH Placed
1335 26.60 ML. #2 - Bad Frog Point - Just Welded 7/21/2005
1336 26.60 ML. #2 - Bad Frog Point - Just Welded 7/21/2005 -
1337 26.50 ML. #1 - Bad Frog Point - Just Welded 7/21/2005
1338 26.50 M.L. #1 - Bad Frog Point - Just Welded 7/21/2005
1339 26.85 M.L. #2 - Bad Frog Point - Just Welded 7/21/2005
1340 23.75 M.L. I to 2 - View of Surface on Crossover 7/21/2005
1341 23.78 M.L. #1 - Frog Point Needs Welding 7/21/2005 -
1342 27.78 M.L. #1 - Frog Point Needs Welding 7/21/2005
1343 23.67 M.L. #2 - Frog Point Just Welded 7/21/2005
1344 23.67 M.L. #2 - Frog Point Just Welded 7/21/2005
1345 23.65 M.L. #2-Frog Point Just Welded 7/21/2005
1346 23.65 M.L. #2 - Frog Point Just Welded 7/21/2005
! 1347 21.08 M.L. #2 - Swinging Joint - Bottered (1347) 7/21/2005
1348 21.06 M.L. #2 - New Frog Replacement (1348) 7/21/2005
1349 17.9! ML. #1 - Bad Frog Point (1349) 7/21/2005
1350 17.90 M.L.1 to 2 - Surface on Crossover (1350) 7/21/2005
1351 17,80 ML. #2 - Bad Frog Point 7/21/2005
1352 17.80 M.L. #2 - Bad Frog Point 7/21/2005
1353 17.77 M.L. #2 - Bad Frog Point 7/21/2005
1354 17.23 M.L. #2 - Bad Chipped Frog - Replace 7/21/2005 25 MPH Placed
(Pt. Down 5/8 - 3/4" / 24' AHD Pt. -3/4"
1355 17.23 M.L. #2 - Bad Chipped Frog - Replace 7/21/2005
(Pt. Down 5/8 - 3/4" / 24" AND Pt. - 3/4"
1356 17.20 ML. #2 - Bad Chipped Frong - Wing 7/21/2005
(Pt. Down 5/8 - 3/4" / 24" AHD Pt. - 3/4"
1357 67.30 ML. #1 - Crane Driving 10' Sheets 7/21/2005
1358 67.30 ML. #1 - 10" Sheet on Truck 7/21/2005
1359 67.30 ML. #1 - 10' Sheet Pipe on Ground 7/21/2005
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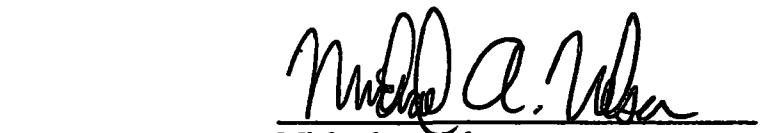
BNSF PHOTOS - BILL WIMMER
BNSF PHOTOS #4
PHOTO #IMP LOCATION bESCRIPTION DATE OF PHOTO SLOW O!bER
ORIN SUBDIVISION
1360 67.25 M.L. #1 - Sheets briven in Cut 7/21/2005
1361 67.25 M.L. #1 - Sheets briven in Cut 7/21/2005
1362 69.51 M.L. #1 -20" Sheet Pile 7/21/2005
1363 69.51 M.L. #1 - Sheet briven in Cut 7/21/2005
1364 69.51 M.L. #1 - Sheet briven in Cut 7/21/2005
1365 69.51 M.L. #1 - Sheet briven in Cut 7/21/2005
1366 69.63 M.L. #1 - 2 Bambi @ Water Hole 7/21/2005
1367 69.40 Steckley Road Guard 7/21/2005
1368 BR 91.72 10" brains brilled in Back WaIl 7/21/2005
1369 BR 91.72 M.L. #1/#2 - 10" brains brilled in Bock Wall 7/21/2005
1370 BR 91.72 M.L. #1/#2 - 10" brains brilled in Bock WaIl 7/21/2005
1371 BR 91.72 M.L. #1/#2 - 10" brains brilled in Back WaIl 7/21/2005

VERIFICATION

I, Michael A. Nelson, declare under penalty of perjury that the foregoing is true and correct. Further, I certify that I am qualified and authorized to file this verified statement.



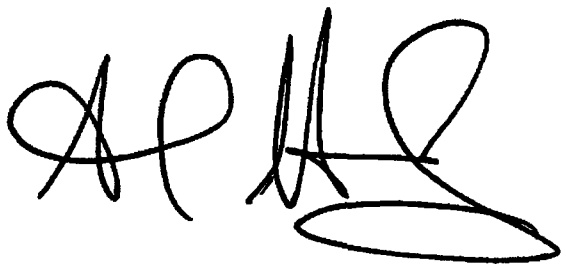
Michael A. Nelson

Executed on June 1, 2010

PUBLIC VERSION

CERTIFICATE OF SERVICE

I hereby certify that on this 4th day of June, 2010, I caused a copy of the foregoing to be served via electronic service on all parties of record on the service list in this action.



Alex Menendez